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apcmag

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- **Graphics card** Diamond Viper II

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$2,499* plus delivery.
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- Microsoft® OEM Works Suite 99
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- 3 Year Limited Warranty
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- Integrated Creative Labs 64 Voice Sound
- 40X Max[2] Variable CD-ROM Drive
- 15" Colour Monitor (13.7" v.i.s.)
- Microsoft® Intellimouse™
- Microsoft® Windows® 98 Second Edition
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- Free Lifetime Telephone Technical Support

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E•VALUE CODE 220109A–470301

Dell recommended upgrade options:
- Add additional software applications with Microsoft Office 2000 OEM SBE $181
- Back-up valuable data with Iomega 100MHz Zip Drive $140

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Dell has pioneered the direct way of manufacturing and selling PCs, and it's seen us rise to become the Number Two PC company in the world†† and win prestigious awards like the Australian Personal Computer's Service & Reliability Award in July 1999†. But we don't just build computer systems. We build solutions. Rest assured Dell has the system to solve all your computing needs. How can we be so confident? Here are 5 good reasons:

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3. ORDERING ON-LINE IS EASY

Dell offers on-line customers access 24 hours a day, 7 days a week. Our website contains over 35,000 pages of technical information, including secure shopping, real-time pricing updates, trouble-shooting and much more.

4. WE USE THE LATEST TECHNOLOGY WE CAN GET OUR HANDS ON

Dell's built-to-order business model means there are no warehouses piled high with ageing product. So when we get your order, we're able to build your system using the very latest technology we can get our hands on.

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- 17" Colour Monitor (15.9" v.i.s.)
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- Microsoft® OEM Works Suite 99
- McAfee Virus Scan
- Conexant™ V.90/56K PCI Telephony Modem for Windows
- Logitech MouseMan Wheel (PS/2V)
- Microsoft® Natural® Keyboard Pro
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- Free Lifetime Telephone Technical Support

$4,599* plus delivery. $38 per week**

E•VALUE CODE 210124–470301

Dell recommended upgrade options:
- Expand storage capacity with 37.5GB[1] Hard Drive $449
- Make your applications easier to see by upgrading your monitor to 19"(17.9"v.i.s.) for only $430

DELL DIMENSION™ *XPS B600R DESKTOP*

- Intel® Pentium® III Processor 600E MHz
- Mini Tower Model
- 256KB On-Die L2 Cache
- 128MB PC700 356MHz RDRAM
- 13.6GB[1] Ultra ATA Hard Drive (7200rpm)
- 3.5" 1.44MB Diskette Drive
- 32MB NVIDIA TNT2 M64 2X AGP Graphics Card
- Turtle Beach Montego II 320Voice PCI Sound Card
- 48X Max[2] Variable CD-ROM Drive
- 17" Colour Monitor (15.9" v.i.s.)
- Harmon Kardon Stereo Speakers
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 99
- McAfee Virus Scan
- Conexant™ V.90/56K PCI Telephony Modem for Windows
- Logitech MouseMan Wheel (PS/2V)
- Microsoft® Natural® Keyboard Pro, Dell Edition
- Telstra Big Pond ISP Offer
- 3 Year Limited Warranty
- Free Lifetime Telephone Technical Support

$3,599* plus delivery. $30 per week**

E•VALUE CODE 210119A–470301

Dell recommended upgrade options:
- Expand storage capacity with 27GB[1] Hard Drive $243
- Back up valuble data with Iomega 100Mhz Zip Drive $140

DELL DIMENSION™ *XPS T700R DESKTOP*

- Intel® Pentium® III Processor 700MHz
- Mini Tower Model
- 256KB On-die L2 Cache
- 64MB 100MHz SDRAM
- 13.6GB[1] Ultra ATA Hard Drive
- 3.5" 1.44MB Diskette Drive
- 32MB Diamond Ultra TNT2 V770U AGP Graphics Card
- Turtle Beach Montego II 320 Voice PCI Sound Card
- 48X Max[2] Variable CD-ROM Drive
- 17" Colour Monitor (15.9"v.i.s.)
- Harmon Kardon Stereo Speakers
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 99
- McAfee Virus Scan
- Conexant™ V.90/56K PCI Telephony Modem for Windows
- Microsoft Intellimouse
- Dell QuietKey Keyboard
- Telstra Big Pond ISP Offer
- 3 Year Limited Warranty
- Free Lifetime Telephone Technical Support

$3,499* plus delivery. $29 per week**

E•VALUE CODE 210119–470301

Dell recommended upgrade options:
- Expand storage capacity with 20.4GB[1] Hard Drive $150
- Make your applications easier to see by upgrading your monitor to 15" Flat Panel Monitor for $1,449

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DELL POWEREDGE™ SERVERS AND PRECISION™ WORKSTATIONS

DELL POWEREDGE™ *2400 SERVER*

- Intel® Pentium® III Processor 533MHz (Dual Processor Capable)
- Rack-mount Capable Minitower (Midnight Grey)
- 256KB Internal L2 Cache/133MHz
- 128MB 133MHz SDRAM With ECC (Upgradeable to 2GB[1])
- 9GB[1] LVD SCSI Hard Drive
- 3.5" 1.44MB Diskette Drive
- Standard Intel Pro 100+ NIC
- Integrated Ultra2/LVD and Ultra/Narrow SCSI Controllers
- 40X Max[2] Variable SCSI CD-ROM Drive
- 15" Colour Monitor (13.7" v.i.s.)
- Dell Mouse
- Standard Openview Network Node Manager S.E.
- 3 Year Limited Warranty (With 1 Year Next Business Day On-Site Service)***
- Free Lifetime Telephone Technical Support

$4,749* plus delivery. $39 per week**

E•VALUE CODE 420124-470301

Dell recommended upgrade options:
- Add extra processing power with an additional Intel® Pentium® III Processor 533MHz $841
- Expand storage capacity with and additional 9GB[1] Hard Drive (7,200rpm) $748

DELL POWEREDGE™ *1300 SERVER*

- Intel® Pentium® III Processor 500MHz (Dual Processor Capable)
- Minitower (Midnight Grey)
- 512KB Internal L2 Cache
- 64MB 100MHz SDRAM With ECC (Upgradeable to 1GB[1])
- 9GB[1] LVD SCSI Hard Drive
- 3.5" 1.44MB Diskette Drive
- Standard Intel Pro 100+ NIC
- Integrated Ultra2/LVD SCSI Controller
- 40X Max[2] Variable EIDE CD-ROM Drive
- Dell Mouse
- Standard Openview Network Node Manager S.E.
- 3 Year Limited Warranty (With 1 Year Next Business Day On-Site Service)***
- Free Lifetime Telephone Technical Support

$3,109* plus delivery. $25 per week**

E•VALUE CODE 420116-470301

Dell recommended upgrade options:
- Add extra processing power with an additional Intel® Pentium® III Processor 500MHz $654
- Expand storage capacity with and additional 9GB[1] Hard Drive (7,200rpm) $748

DELL PRECISION™ *WORKSTATION 420*

- Intel Pentium® III Processor 733MHz/133 FSB
- Mini tower Model
- Intel® 840 AGPset - Dual Processor Capable
- 256KB Integrated Full Speed Cache
- 128MB PC800 133MHz RDRAM with ECC
- 9GB[1] Ultra 160/M SCSI Hard Drive (10,000rpm)
- 3.5" 1.44MB Diskette Drive
- Integrated 3Com Fast Etherlink XL (3C920) –10/100 Base-TX
- Integrated Ultra 160/M SCSI Controller
- Integrated Dual ATA-66 EIDE Controller
- 32MB Diamond Fire GL1 256bit AGP Graphics Card
- Integrated SoundBlaster Pro Compatible
- 40X Max[2] Variable SCSI CD-ROM Drive
- 19" Sony Trinitron Monitor (17.9" v.i.s)
- Microsoft Intellimouse
- Microsoft® Windows NT® 4.0 (with FREE Microsoft Windows 2000 Upgrade Voucher)
- 3-Year Limited Warranty (with 3–Year Next Business Day On-Site Service)***
- Free Lifetime Telephone Technical Support

$8,179* plus delivery. $68 per week**

E•VALUE CODE 620143-470301



Dell Inspiron™7500

DELL INSPIRON™ NOTEBOOKS

DELL INSPIRON™ 7500 *R600VT NOTEBOOK*

- Intel® Pentium® III Processor 600MHz
- 256KB On-Die L2 Cache
- 128MB 100MHz SDRAM
- 12GB[1] Ultra ATA Hard Drive
- RealPort CardBus Ethernet 10/100 & Modem 56K (32Bit)
- 8MB ATI RAGE Mobility™ - P 2X AGP Video Controller
- High-fidelity Audio SoundBlaster Compatible
- 24X Max[3] Variable CD-ROM Drive with 3.5" 1.44MB Diskette Drive (Modular Combo)
- 15" Hi-Res SXGA TFT Display (1400x1050).
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 99
- Deluxe Carrying Case
- 1 Year Limited Warranty (With International Coverage)
- Telstra Big Pond Business ISP Offer
- Free Lifetime Telephone Technical Support

$5,999* plus delivery. $50 per week**

E•VALUE CODE 520131-470301

Dell recommended upgrade options:
- Expand storage capacity with 25GB[1] Hard Drive $1,122
- Extend the time you can be on the road, add a second battery $206

DELL INSPIRON™ 3700 *R500GT NOTEBOOK*

- Intel® Pentium® III Processor 500MHz
- 256KB On-Die L2 Cache
- 64MB 100MHz SDRAM
- 12GB[1] Ultra ATA Hard Drive
- 3.5" 1.44MB Diskette Drive
- RealPort CardBus Ethernet 10/100 & Modem 56K (32Bit)
- 8MB ATI Mobility M1™ 2X AGP Video Controller
- High-fidelity Audio SoundBlaster Compatible
- 24X Max[3] Variable CD-ROM Drive
- 14.1" XGA Colour TFT
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 99
- Deluxe Carrying Case
- 1 Year Limited Warranty
- Telstra Big Pond Business ISP Offer
- Free Lifetime Telephone Technical Support

$5,179* plus delivery. $43 per week**

E•VALUE CODE 520127-470301

Dell recommended upgrade options:
- Expand storage capacity with 18GB[1] Hard Drive $561
- Add additional software applications with Microsoft Office 2000SBE $236

DELL INSPIRON™ 7500 *R450LT NOTEBOOK*

- Intel® Pentium® III Processor 450MHz
- 256KB On-Die L2 Cache
- 64MB 100MHz SDRAM
- 6.0GB[1] Ultra ATA Hard Drive
- 3Com® 10/100 LAN CardBus PC Card
- 8MB ATI RAGE Mobility™ - P 2X AGP Video Controller
- High-fidelity Audio SoundBlaster Compatible
- 24X Max[3] Variable CD-ROM Drive with 3.5" 1.44MB Diskette Drive (Modular Combo)
- 15" XGA Colour TFT Display
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 99
- Deluxe Carrying Case
- 1 Year Limited Warranty (With International Warranty)
- Telstra Big Pond Business ISP Offer
- Free Lifetime Telephone Technical Support

$4,629* plus delivery. $38 per week**

E•VALUE CODE 520124-470301

Dell recommended upgrade options:
- Expand storage capacity with 18GB[1] Hard Drive $841
- Back-up valuable data with Iomega 100MHz Modular Zip Drive $234

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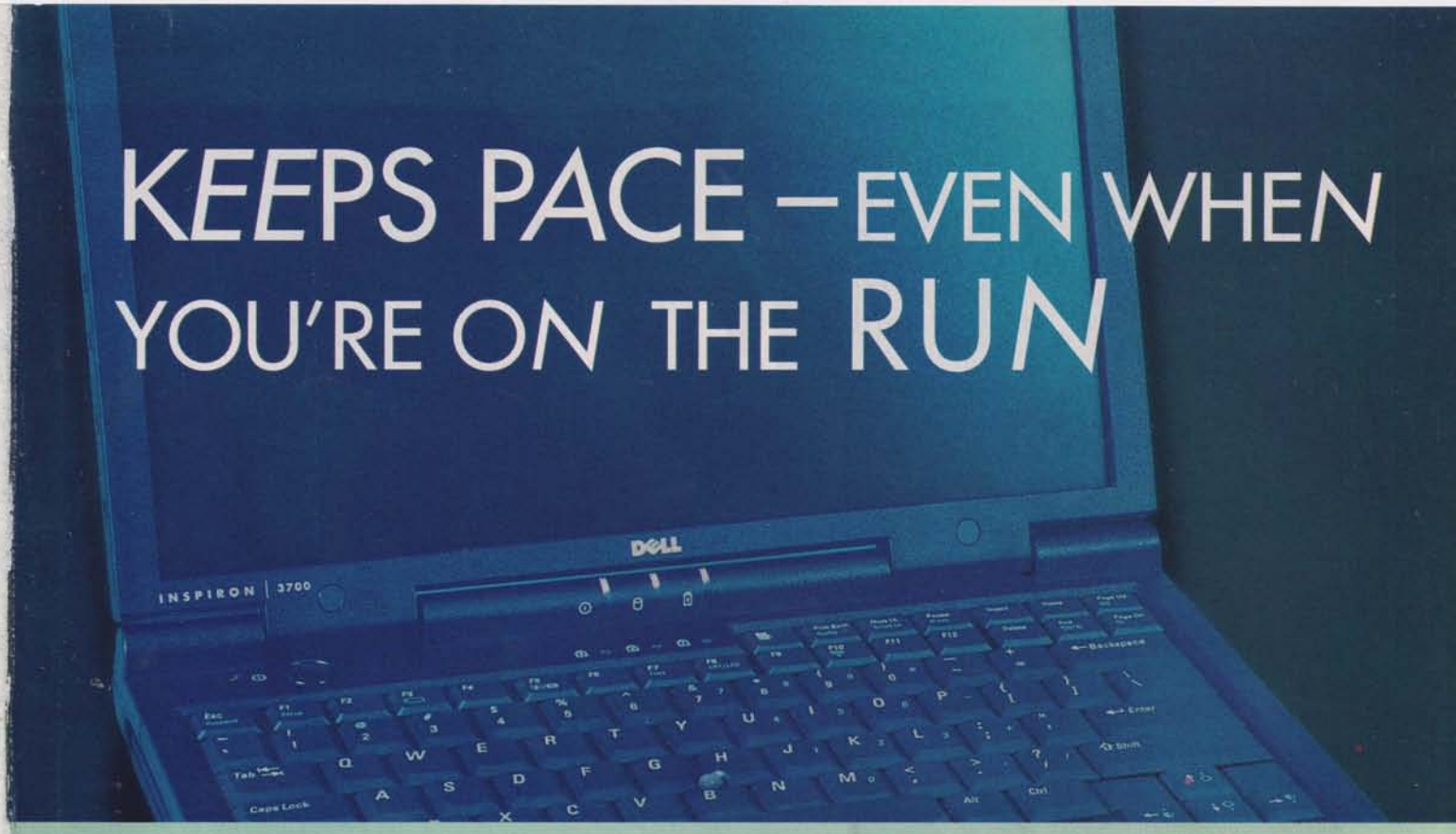
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No matter how fast you are working, you can trust the Dell Inspiron™ 3700 to be there with you. Designed as a fully featured notebook perfect for the road, it weighs in at just under 3kg, so you can take your business wherever you want to go.

Alternatively, you can choose the Dell Inspiron™ 7500, a powerful desktop replacement notebook. The Dell Inspiron 7500 delivers incredible processing power, stunning 2D and 3D graphics on amazing 15" or 15.4" displays, and incredible hard drive expansion capacity of 75GB[1].



Dell Inspiron™ 3700 Tahoe Blue
(Also available in Storm Grey)

DELL INSPIRON™ 7500 *R650YT NOTEBOOK*

- Intel® Pentium® III Processor 650MHz
- 256KB On-Die L2 Cache
- 256MB (2x128) 100MHz SDRAM
- 18GB[1] Ultra ATA Hard Drive
- RealPort CardBus Ethernet 10/100 & Modem 56K (32Bit)
- 8MB ATI RAGE Mobility™ – P 2X AGP Video Controller
- High-fidelity Audio SoundBlaster Compatible
- 24X Max[2] Variable CD-ROM Drive with 3.5" 1.44MB Diskette Drive (Modular Combo)
- 15.4" SXGA TFT Display (1280x1024)
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 99
- Leather Carrying Case
- 1 Year Limited Warranty (with International Coverage)
- Telstra Big Pond Business ISP Offer
- Free Lifetime Telephone Technical Support

$8,279* plus delivery. $69 per week**
E•VALUE CODE 520144-470301

Dell recommended upgrade options:
- Add additional software applications with Microsoft Office 2000 SBE $236
- Extend the time you can be on the road, add a second battery $206

DELL INSPIRON™ 7500 *R500VT NOTEBOOK*

- Intel® Pentium® III Processor 500MHz
- 256KB On-Die L2 Cache
- 64MB 100MHz SDRAM
- 12GB[1] Ultra ATA Hard Drive
- 3Com® 10/100 LAN CardBus PC Card
- 8MB ATI RAGE Mobility™ – P 2X AGP Video Controller
- High-fidelity Audio SoundBlaster Compatible
- 24X Max[2] Variable CD-ROM Drive with 3.5" 1.44MB Diskette Drive (Modular Combo)
- 15" Hi-Res SXGA TFT Display (1400x1050)
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 99
- Deluxe Carrying Case
- 1 Year Limited Warranty (With International Warranty)
- Telstra Big Pond Business ISP Offer
- Free Lifetime Telephone Technical Support

$5,579* plus delivery. $47 per week**
E•VALUE CODE 520129-470301

Dell recommended upgrade options:
- Extend the time you can be on the road, add a second battery $206
- Add a Port Replicator to connect to your network more quickly $486

DELL INSPIRON™ 3700 *R450GT NOTEBOOK*

- Intel® Pentium® III Processor 450MHz
- 256KB On-Die L2 Cache
- 64MB 100MHz SDRAM
- 4.8GB[1] Ultra ATA Hard Drive
- 3.5" 1.44MB Diskette Drive
- 3Com® 10/100 Lan CardBus PC Card
- 8MB ATI RAGE Mobility™– P 2X AGP Video Controller
- High-fidelity Audio SoundBlaster Compatible
- 24X Max[2] Variable CD-ROM Drive
- 14.1" XGA Colour TFT Display
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 99
- Deluxe Carrying Case
- 1 Year Limited Warranty
- Telstra Big Pond Business ISP Offer
- Free Lifetime Telephone Technical Support

$4,299* plus delivery. $36 per week**
E•VALUE CODE 520122-470301

Dell recommended upgrade options:
- Expand storage capacity with 18GB[1] Hard Drive $935
- Bring a printer with you, add the HP 340 Portable DeskJet $489

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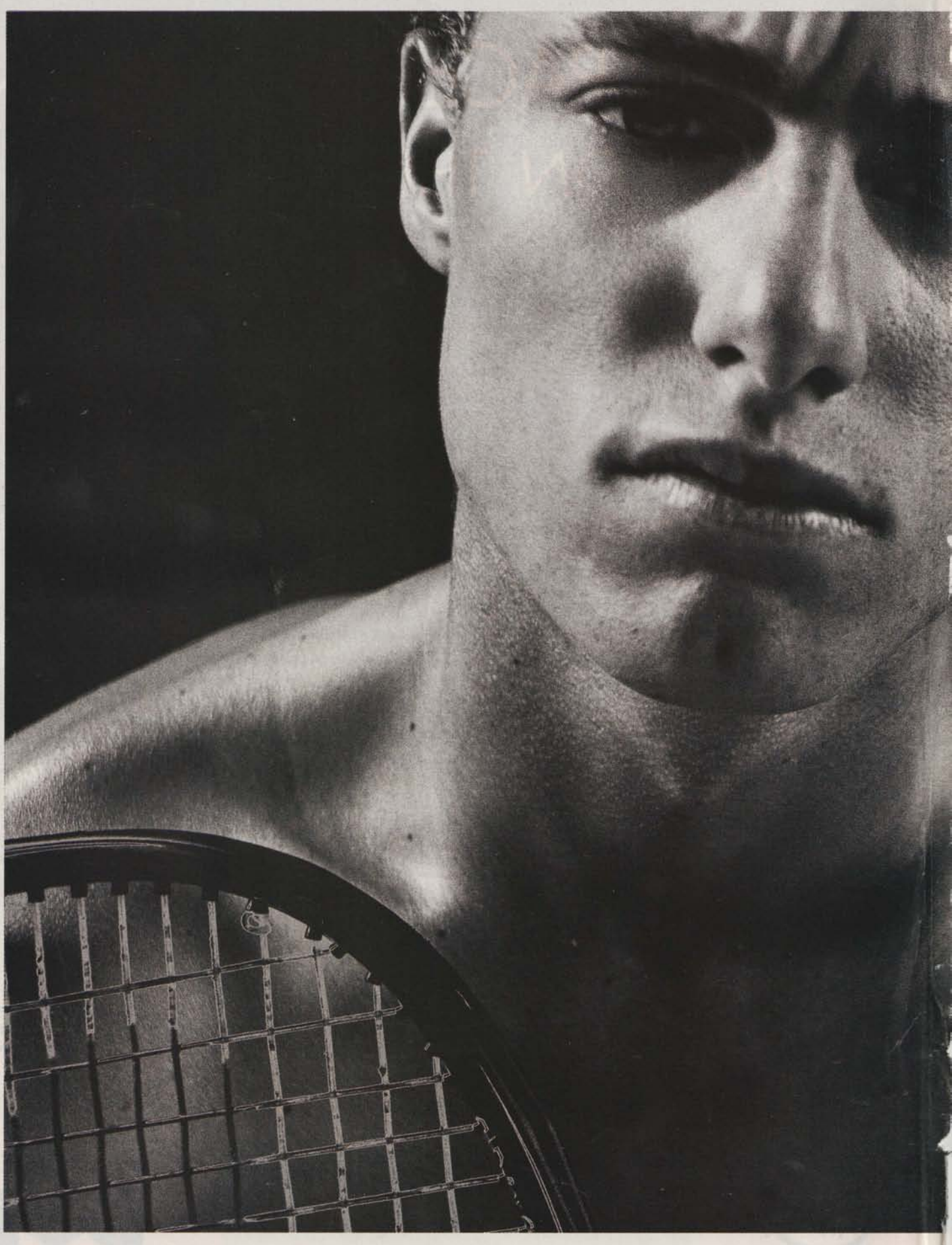
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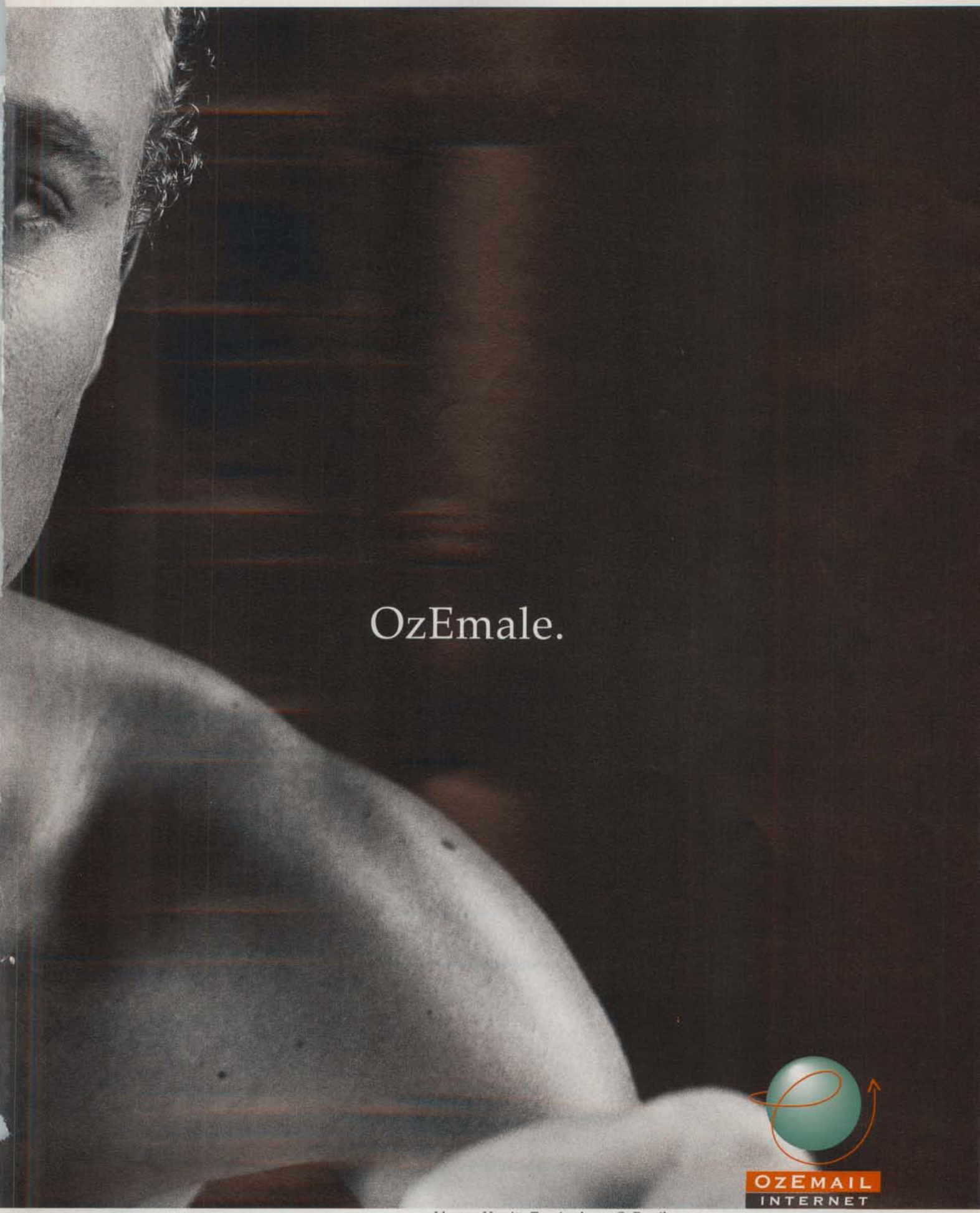
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EDITOR'S NOTE



Trends tell a story

For those who've despaired of ever getting better reliability from today's products, or better service when it comes to maintaining them — despite our myriad technical advancements — don't give up hope just yet. Although we at *APC* can't really do anything about crappy products and service in other industries, we do pride ourselves on being able to highlight some of the high and low achievers in the local PC and related fields via our annual PC Service & Reliability survey.

Apart from our monthly Service & Reliability column, once a year we invite our readers to complete a detailed survey on what's good and bad about their PC (and this year, peripherals too) and related service. This year's survey appears on page 60 of this issue of *APC*, and we'll bring you the results in several months' time.

As with most credible surveys, the trends that appear provide a valuable guide not only to technology buyers, but also to vendors. So much so that the vendors that excel in the eyes of our readers regard such results quite seriously, as do those that don't fare quite so well. While there'll always be an occasional out-of-character customer experience, the overall trends that our surveys reveal make very interesting reading.

For you as readers and purchasers, we feel that *APC*'s annual PC Service & Reliability survey is an ideal opportunity to let your technology peers know what's really going on in purchasing land. It's a forum where the total impact of your comments about your buying and computing experiences really is greater than the sum of the individual parts.

I've heard it said that people are more likely to correspond or complete surveys if they're especially cheesed off about a particular product or service. I can relate to that, because I'm cheesed off right now about having to wait in a national company's phone queue (not mentioning any names) for about 30 minutes to organise a personal matter that had to be attended to immediately. I simply gave up in the end, but my 'peevedness' will live on.

But regardless of your goodwill or otherwise towards a vendor, we hope you'll put a little time aside to complete the survey and give us as accurate a picture as possible of the local computing scene.

Steven Fear

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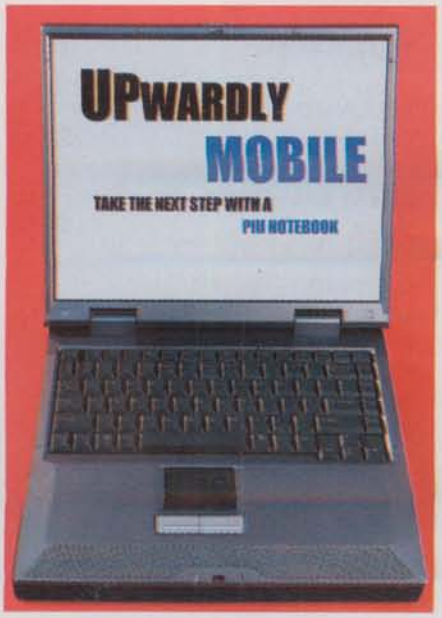


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PIII NOTEBOOKS



Almost a year after the release of the Pentium III, the long wait for the processor to be available in a notebook is finally over. *APC* put a slew of the newest Pentium III notebooks through their paces.

Notebooks reviewed:
Compaq Armada M700
Dell Latitutde CRx H500GT
Gateway Solo 9300 XL
IBM ThinkPad 390X
NEC Versa LXi
Pioneer Powerbook
Toshiba Tecra 8000

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REVIEWS

ALL MAIL REVUE

Email has moved rapidly from being a novelty to a business necessity. What software is best for your email needs? *APC* tested 11 candidates from free software to big name commercial packages to help you decide.

99

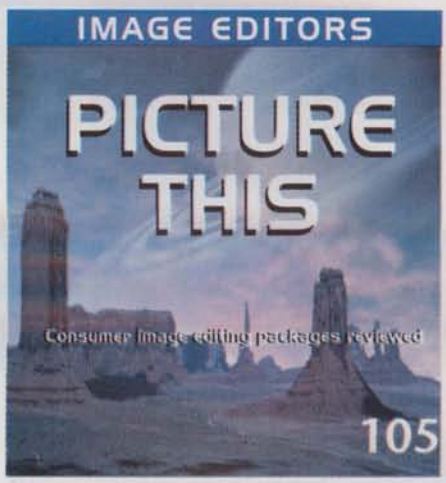
Products reviewed:
Calypso 3.00.03
eMail 97 Premier Edition
Eudora Pro Email 4.2.2
Netscape Communicator 4.7
Notes 5
Outlook 2000
Outlook Express 5.0
Outlook Express 5.0 for Mac OS
Pegasus Mail 3.11
Poco 1.2
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Digital images are now more comon than ever with the proliferation of cameras and scanners. *APC* looks at seven top image editors to help you decide the best package for you for manipulating your images without breaking the bank.

Products reviewed:
Adobe PhotoDeluxe Home Edition 3.0
Corel Photo House 5
Corel Photo-Paint 9
Jasc Paint Shop Pro 6
Microsoft PhotoDraw
Ulead Photo Express
Ulead PhotoImpact 5

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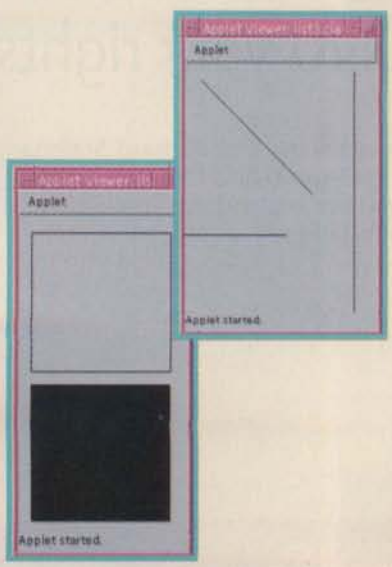
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FEATURES



The tyranny of bandwidth

Prices for cable Internet and ADSL continue to fall in the US, but dialup is still the only option for most Australians. Will the tyranny of distance mean that Australia will always be left behind? *APC* looks at the politics of bandwith in Australia.

BOOK FREEDOM

Although not yet available in Australia, 'ebooks' have established a foothold in the US. What do you do with them and what will their impact be on traditional book publishing?





QUANTUM LEAPS

The science of quantum physics has been a research topic for more than 70 years. The computer world only began to pay serious attention to its application to computing in the last decade.

PROFILE

GNU your rights

An interview with Richard Stallman, Linux legend and founder of the GNU project and the Free Software Foundation.



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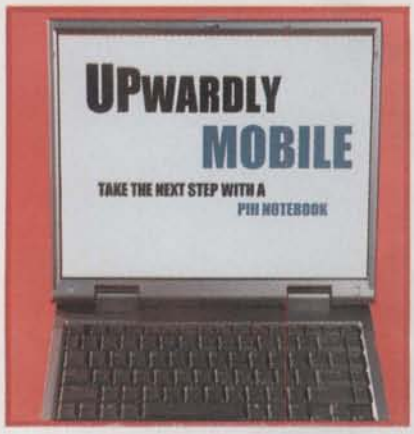
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Your guide to the cover CDs

apcmag.cd complements both the magazine and **apcmag.com**. Each month's disc collection features software related to articles in that issue, as well as special CD-only features and the latest Web browsers, OS patches and popular tools.



Each piece of software includes instructions on whether you will need to unzip the file before installing it, and most also include README files. A complete list of software included on this month's discs is included below.

All you need to use **apcmag.cd** has been created in HTML. You do not need any special software to access the discs, other than a standard browser. The CDs have been tested using Netscape Navigator 3.0 and 4.0, and Microsoft Internet Explorer 3.0 and 4.0.

All software on the CDs is provided as is, without any warranty, express or implied. Complete terms and conditions are included on the CD itself; click on the Conditions of Use link for details.

How to run the CDs

Before using the CDs, please read the Conditions of Use online at **apcmag.com/apcmag.cd**. These CDs use an Autorun feature for Windows 95, 98 and NT systems. Just insert **apcmag.cd** and your browser will automatically load with the **apcmag.cd** front page. Users of other platforms can simply launch their favourite browser and load the file DEFAULT.HTM in the root directory of the CD. For further information, see the instructions on the back cover of the CD cover.

You should carefully read the licensing agreements and honour any evaluation or shareware terms specified, read all instructions and README files, and virus-check every program before use.

While *APC* has taken every care to ensure that the software provided is useful and that it works, we cannot accept responsibility or liability for any of the products included.

What's on the CDs

Disc 1

NEW AND HOT

WINDOWS
1st Choice FTPPro2000 7.5, Abe's MP3 Finder 4.0b9, Color Pilot 3.14, ConnectEasy 2.0.3, Cool Call 1.3.5, Dir Prudence 1.2, EasyMTU 3.0, Easy Photo Maker 1.0.2, Fax2000 6.2, Figment, FileProbe 1.50.02, Inteli-SMART, Internet Firewall 2000 for PCs, MP3 CD Maker 1.19, Personal Stock Monitor 4.0, Quick Settings 1.02, Simple Web Site Search Engine 1.0, TextPad, Web Supervisor 2.4.3.1, WebMail Notify 3.63

MAC
Anarchie 3.7, BladeEnc 1.0, Cross Platform 1.1.1, Doublet Scan 2.5, FinderOFFPro 1.0, FoldersSynchronizer 1.8, ICQ (PowerPC with Chat) 1.9.0, iTimer 1.1, NameCleaner 2.0.1, Telnet 3.0a12, NetMonitor 2.0, Now Up-to-Date & Contact 3.8, QuickTime Channel Guide 1.0, Smart Scroll 2.6b2, SoundJam MP 1.5.1, ViaHTTP 1.7, World Clock CSM 2.7.1

LINUX
Blade 0.1.0, FreeWRL 0.21, GnomeICU 0.68, GtkExtra 0.99.0, jEdit 2.2final, JEL 0.8.3, JSwat 0.5.5, Licq 0.75-991219, LTSP 1.01, memtester 2.85, mod_cgisock 0.1.4, PHP firewall generator 0.3, pi-address 0.3.3, PuzzleSquare 0.0, smtm 0.8.0, TkHeadlines 0.68, VeteScan 12-18-99, WebNews 0.06a, X-Chat 1.3.9, XCounter 1.0.1

WINDOWS CE
AlarMe 3.0, CeProbe 1.1, iBrowser 2.04, Pocket Artist 1.0, Yahoo Messenger 1.0

PSION
FIFinger 1.1, MenuS5 1.6a, Psi-Sync WindowsCE: AlarMe 3.0, CeProbe 1.1, iBrowser 2.04, Pocket Artist 1.0, Yahoo Messenger 1.0

PALMPILOT
Accounts and Loans 1.10a, Mirror 1.0, TealScript 2.08, Time 1.71, Wireless Fax 1.01

GAMEZONE
Homeworld, NBA Live 2000, Revenant, USAP

BANDWIDTH BUSTERS
PGP Personal Edition 6.5, VirusScan 4.0

WORKSHOP

Windows: ChessPartner 4.2, Deep Green Reversi 4.2, Chessvision 1.2 (Free Version), David's Backgammon 3.1, Four Winds Mah Jong 1.0.9

Linux: Qcad, Nessus, Emacs, Xbill

Mac: QDesign MVP 1.0, NetCD 1.6.7, MacP3 1.5, mp3voodoo 1.1, Macast Lite 1.5.3

OS/2: WARP CD-Copy 1.0b1, MP3PM 0.60b, CD2MP3 1.13, PM123 1.01

PDAs
TealScript, TealEcho, HandMemo, ScreenWrite, WordComplete, SpellMan, Jot, Quikwriting, CalliGrapher

INTERNET TOOLKIT
Adobe Acrobat Reader 4.0, Eudora Light 3.06, Free Agent 1.11, GoZilla 3.5, mIRC 5.6, RealPlayer G2, WinZip 7.0, WS_FTP LE 5.06

BROWSERS
Microsoft Internet Explorer (32-bit) 5.01, Netscape Navigator 4.08

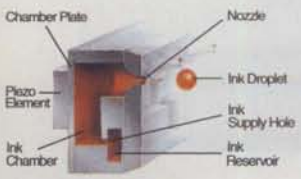
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Disc 2

FEATURE
Ulead PhotoImpact 4.0 full version

IMAGE EDITORS
A Square Image 1.0, Adobe Photo Deluxe, Chaos Fx 1.2.5, Lview Pro 2.7, Paint Shop Pro 6.01, Painter 5.0, Picture Publisher 7.0, PolyView 3.31, Ulead Photo Express 2.0, Ulead PhotoImpact, WebPainter 3.01, Xara Webster 2.0

EMAIL PACKAGES
Becky Internet Mail for Windows 95 1.25, Calypso E-mail Version 3.0, email 97 1.4, Eudora Pro Email 4.2.2, FoxMail (32-bit) 2.1, Mail Explorer 1.24, NetMail 2.86, Pegasus Mail 3.11, Poco 1.2, Postman 2.1, The Bat 1.36, TrayMail

CD highlights

Disc 1
Free full version of PhotoImpact 4.0

Ulead's PhotoImpact 4.0 is an image editing application, incorporating 32-bit performance, MMX technology and Easy Palette drag-and-drop editing. It can be used for retouching photos, editing images and creating Web graphics. PhotoImpact 4.0 provides high-end imaging technology within a framework that allows even novices to achieve quality results.

Disc 2
Win one of five copies of Adobe PhotoDeluxe Home Edition 4.0

Adobe PhotoDeluxe Home Edition is an image editor which allows you to bring photos to your computer and organise them into albums, and make repairs and improvements. Create personalised photo projects using clip art and templates, supplied with the software.

APC will give away five copies of Adobe PhotoDeluxe Home Edition 4.0 to the readers with the most creative response to a simple question. See **apcmag.cd** for competition details.



apcmag.cd February sponsors
Disc 1
AOL, OzEmail, Telstra Big Pond, TPG Internet
Disc 2
dingo blue, Gateway

Handwriting recognition enhancements and add-ons

As handwriting is very personal, software that works well for one individual may not work for another. You should try the package that comes with your PDA and test the alternatives before deciding what's best for you. The following programs are on disc 1 of **apcmag.cd.**





Palm computing enhancements

- **TealScript** Adds extra features to Graffiti (http://www.tealpoint.com/)
- **TealEcho** Displays your pen strokes on the screen (http://www.tealpoint.com/)
- **HandMemo** Lets you mix text and ink in one memo-type screen.
- **ScreenWrite** Write Graffiti anywhere on the screen (http://www.inkverse.com/)
- **WordComplete** Pops up a list of possible words while you write (http://www.cic.com/)
- **SpellMan** Spellchecker (http://www.standalone.com/)

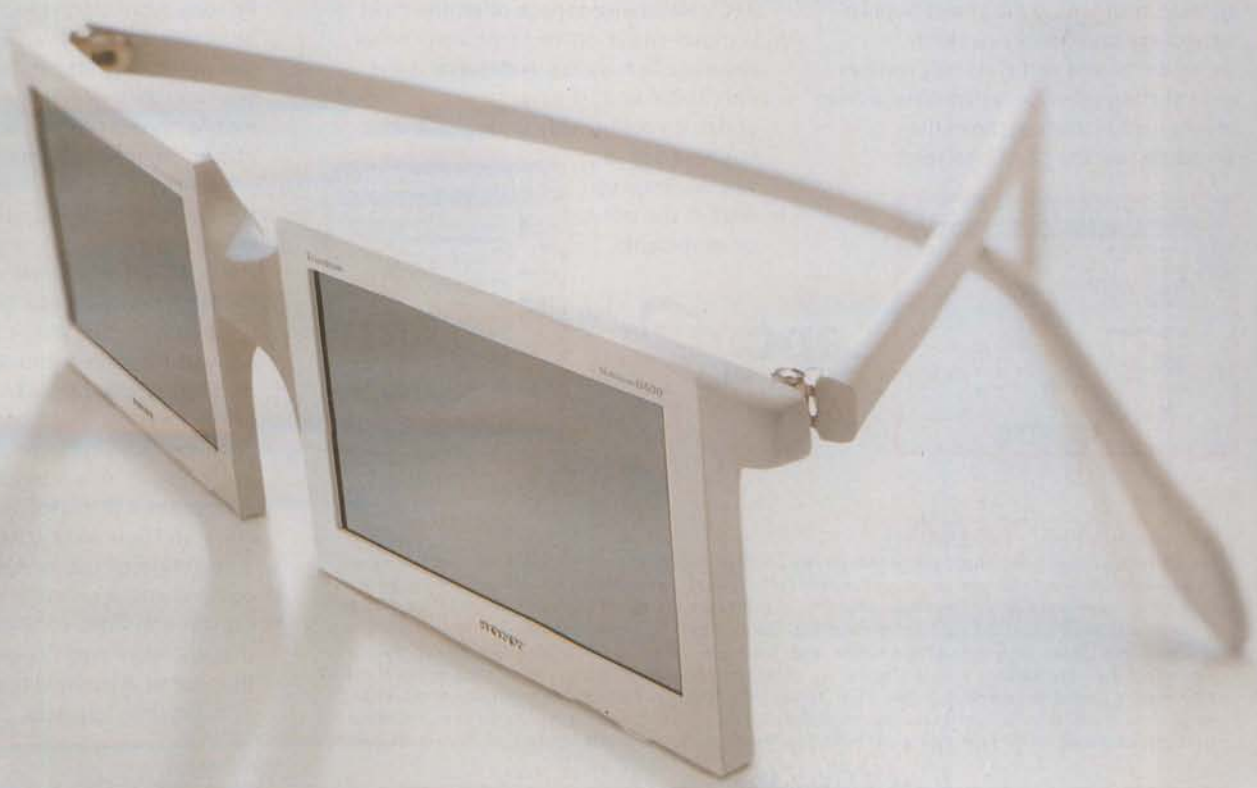
Graffiti replacements

- **Jot** The same as on Windows CE units (http://www.cic.com/)
- **Quikwriting** A very different method of entering text (http://www.mrl.nyu.edu/perlin/demos/quikwriting.html)

Jot alternatives (for CE and Psion)

- **CalliGrapher** Intelligent handwriting recognition, which adapts to your writing style and can handle block writing and cursive (http://www.paragraph.com/ for CE, http://www.atelier.tm/ for Psion)
- **ARTrecognition** Handwriting and voice recognition (http://www.artcomp.com/)
- **WerdIT** Trainable recognition devices (http://www.ewerd.com/)
- **Jot Pro 1.01** An enhanced version of Jot (http://www.cic.com/)

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http://apcmag.com/

apcmag.com is Australia's most popular technology site. The site has lively discussion forums and Web-only reviews and columns, as well as a complete archive of every article that has run in the magazine over the past three years.



Newswire

http://newswire.com.au/

APC's **Newswire** service offers the most comprehensive online technology news coverage in Australia. **Newswire** is the only 100% local IT news service, and is updated continuously throughout each business day so you can keep up with all the latest developments.



Coming up

In March, *APC* examines what it means to be living in a wireless world. Personal technologies such as Bluetooth, IrDA and wireless Ethernet, and public network products such as WAP and third-generation GSM mobile phones will be discussed. We'll also investigate datacasting.

With so much data being sent over the airwaves, security systems are becoming increasingly important. In this light, *APC* has reviewed some of the latest personal security software.

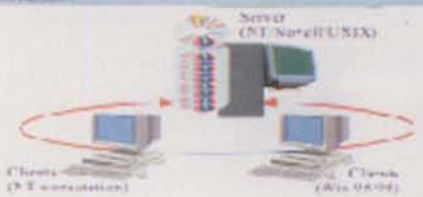
In profiles, *APC* will be talking to networking pioneer and the inventor of Ethernet, Bob Metcalfe. And on the eve of a world application service provision (ASP) conference, ASPCON, in Sydney, there will be a report on the state of the ASP market — how does it work, and how will it affect you?

Finally, look out for *APC*'s comprehensive review of video capture and video editing products that will allow even novices to take their home videos and turn them into cinematic masterpieces.

Conditions of entry

These conditions apply to all competitions in *APC* February, unless specific conditions are provided with the competition. Instructions on 'How to Enter' form part of the Conditions of Entry of all competitions in *APC* February. Entry is free and open to all residents of Australia other than employees of ACP Publishing Pty Ltd (ACN 053 273 546), suppliers of competition prizes, their families and associated agencies. The contests close last mail February 15. Enter according to the instructions supplied with the individual competitions. The judges' decision is final and no correspondence will be entered into. No responsibility is accepted for late, lost or misdirected entries. All entries become the property of ACP Publishing Pty Limited, the promoter, 54 Park Street, Sydney, NSW 1028. The prizes are not transferable or redeemable for cash. Any change in the value of the prizes occurring between the publishing date and the date the prizes are claimed is not the responsibility of the promoter. Winners will be notified by security post and their names published in *APC* April.





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You can also use the feedback form on our Web site:

apcmag.com/feedback/

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And the winner is.....



DIAMOND VIEW 1995
19" Colour Monitor

"Overall, we found the screen image had sharper definition and more clarity than any of the other models, including the 21in models." - ***Australian Personal Computer, April '99.***

"The Mitsubishi Diamond View is alot of monitor . . . boasts 18in of viewable area and brightly coloured, high resolution images" - ***PC World, April '99.***

DIAMOND VIEW 1772e
17" Colour Monitor

". . . has outstanding picture quality and image controls combined with a three-year on-site warranty to make this monitor a very attractive proposition for the home or SOHO user . . . an edge for word processing, spreadsheets or gameplay. Highly recommended." - ***Australian Personal Computer, April '99.***

DIAMOND VIEW 1570i
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STOCK SHOCK

Profits preferred in tech floats

There is a widespread perception that Net companies are rushing to the stock market to make a quick buck before they've even turned a profit. However, the reality is that it's established technology companies with strong revenue streams and a record of profitability that investors are rewarding with high share prices — at least in Australia.

The latest IPO to lend weight to this theory is Melbourne IT. The body responsible for the registration of domain names almost quadrupled its $2.20 issue price when it listed on the Australian Stock Exchange in late December. At one stage of trading the company was worth $9.10, although it subsequently fell back to close at $7.95, a 360% premium on its issue price.

In addition to the .com.au domain, Melbourne IT is one of the testbed registrars for the .com, .org and .net domains. Profitable for the last three years, Melbourne IT

Continued on page 18

OPTUS AND TELSTRA AT WAR

Cable's on the table

A broadband price war appears set to break out following Optus' long-awaited launch of its cable Internet service, Optus@Home. Optus' launch of an 'all you can eat' service came just weeks after Telstra made changes to its pricing policy and alienated many current users.

Unlike Telstra, which charges for its Big Pond Advance (BPA) service on a volume basis, Optus is charging a flat monthly rate for the service, as expected. Customers will receive a permanent Net connection, including access to newsgroups, online games and 25M of online storage space.

Customers who pay on a month-by-month basis will pay $59.95 a month, as well as $398 for installation charges (including a DOCSIS cable modem), adding up to a total annual cost of $1,117.40. Customers who sign up for 12 months pay $69.95 a month, but only pay a $199 installation fee, making the total annual charge $1,038.40. Optus@Home will be available in Sydney and Melbourne first and in Brisbane



by March. Other areas won't receive the service.

Some details were not announced before *APC* went to press, including pricing for existing Optus cable customers. Sales and marketing director John Garner said that discounts would be given to customers using the Optus HFC cable for local telephony or pay television.

Although the service offers unlimited access, this is subject to a "reasonable use policy". Garner said the policy is to ensure fair and equal access for cable Internet users, but wouldn't say whether this will include specific restrictions.

When the announcement was made, Telstra had already suffered a strong backlash over its decision to charge cable customers for files they download. Telstra created fees for services which previously incurred no costs, including direct traffic between cable customers, newsgroup downloading and email received.

In a notice to customers,

Continued on page 18

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AUSTRALIA'S TECHNOLOGY NEWS

Profits preferred in tech floats

Continued from page 17



is forecasting a profit of $3.3 million in the next financial year based on turnover of $24 million.

There are a multitude of recent technology floats that have demonstrated the power of profits and revenue to draw investors; Technology One is one example. A software developer that services the small to medium business market, Technology One tripled its offer price of $1 when it hit the market in December. It counts the Seven Network and the Department of Prime Minister and Cabinet among its customers, and expects its net profit to increase almost 50% this year to $5.5 million, off the back of $31 million in revenue.

Of course, the company that set the benchmark for solid IT floats is financial software company MYOB. The company, which doubled its worth when it went public July last year, was worth about $13 a share when *APC* went to press. The fact that investors are currently valuing the company at almost seven times its $2 issue price has also attracted the attention of the ASX, which has requested that MYOB explain why it is in such high demand.

On the other end of the IPO scale are companies which base their business entirely in cyberspace and have yet to show investors some returns on their money. Leading the charge is Web developer Spike, whose ambition to become the Net broadcaster for youth has failed to impress the investment community. The company closed its first day of trading two cents below its issue price, and has spent the last six months struggling to trade respectably. Spike stock sank to 70 cents at its lowest point, but it has since managed to regain some value.

Other candidates for the 'worst performing IPOs of 1999' include online media company ISIS, which debuted on the ASX at a 35% discount to its $1 offer price, and shopping network TVSN, which closed its first day of trading 38 cents lower than its issue price of $1.20.

Cosima Marriner

Cables on the table

Continued from page 17

Telstra said it made the changes to "eliminate current abuse of our services". A number of pricing plans have been consolidated, charges per additional megabyte have been reduced, and personal Web space has increased from 5M to 10M. "After careful analysis of your feedback, we are making changes that will benefit our customers," Telstra stated in its letter.

But the announcement has caused an uproar in the BPA community. Several Big Pond Advance customers said the changes would force them to leave the service. "The decision to price all data transfers, including download from the Usenet and mail servers, as well as transfers from user to user will effectively kill off one of the most informative and socially active Internet communities in this country," BPA customer Stephen Anderson told *APC*'s **Newswire** service.

Another BPA customer, David Mallard, said the BPA community is disgusted by the new pricing plans which "far outweigh any positive effects" the minor reduction in cost per megabyte may have brought.

One customer, who has been running a Web site dedicated to BPA users over the past 13 months, will be calling it quits. Simon Wright, who developed Whirlpool, a quasi-portal for BPA users, said the decision to meter internal traffic would make it "financially unworkable" to maintain his site.

Unsurprisingly, users on the discussion boards at Whirlpool were quick to welcome the Optus cable service. "I hope that all the losers at Telstra are pissing their pants wondering what the hell they are going to do," one person commented on the site's discussion board.

In the wake of the hundreds of complaints from its subscribers, Telstra may switch tack on the pricing policy. It is reconsidering recent price hikes for its Big Pond Advance cable service. Melanie Feez, manager for broadband Internet services at Telstra, said it has "absolutely not" ruled out changing its pricing following the number of complaints received.

Feez said she was not surprised by the reaction of Big Pond Advance customers. "We were expecting some customers to query the changes," she said. "We're looking at them on an individual basis."

Feez said that Telstra will be closely watching Optus' service and, in conjunction with customer feedback to date, will adjust Telstra's pricing accordingly. "In a competitive environment, the power rests with the consumer," she said.

Angus Kidman, William Maher and Roulla Yiacoumi

APC scores top award

Australian Personal Computer has scored again at the annual AITS IT Writers Awards, with Steven Fear taking out the coveted President's Award for Best Editor.

Fear accepted the award at a function at Sydney's ANA Hotel in late December. "This award is a tribute to the hard work put in by everyone on the *APC* team," said Fear following the event. "While our ultimate measure of success remains delivering a magazine designed to meet the needs of our readers, it's great to receive recognition from the industry in this way."

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INDUSTRY UNCONCERNED

Online gambling ban mooted

Online gaming operators may be forced to move their operations offshore following Prime Minister John Howard's proposed ban on Internet gambling.

"I am particularly concerned about the effect of a rapid expansion of Internet gambling and the government will be investigating the feasibility and consequences of banning Internet gambling," Howard said. "Internet gambling has the potential to dramatically increase the number of problem gamblers because it will be accessible to every household 24 hours a day." He plans to establish a ministerial council to create a national approach on gambling issues.

Howard made the comments as the Productivity Commission released the final version of its investigation into gambling in Australia. The report found that only 0.6% of Australians had gambled online, but that 80% of all Australians gambled in some way in 1998. The commission noted that online gambling could provide some effective age controls, but palliative measures would still need to be taken.

Australian gambling Web site operators declared themselves unconcerned by the news. David Ohlson, executive director of the country's first government-regulated Internet casino, Lasseters Online, doubts prohibiting betting on the Internet will ameliorate the problem of gambling addiction. Rather, he thinks such a move would merely lead to a proliferation of unregulated cybercasinos and offshore operations. "All the problems would continue, and the government would have no control," he said.

Measures such as bet restrictions make online gaming safer for problem gamblers. However, he doubts Howard will make good his threat to ban gambling on the Internet. "If [the issue] is looked at with a very balanced view, then I am not concerned," Ohlson said.

Businesses that accept wagers on sporting events over the Internet believe Howard's comments do not refer to their operations. Con Kafataris, chief executive officer of NSW-based SportOdds said that he would be surprised if the PM's definition of online gambling extended to sports betting.

"Our online business is just an extension of the telephone," Kafataris said. "All you'd be doing would be blocking an extension of telephone betting." Kafataris said he doubts that sports wagering on the Internet would be included in the government's investigation once Howard was made aware of the distinction between it and online gaming.

Angus Kidman and Cosima Marriner

WIN2K VERSUS NETWARE

OS battle heats up

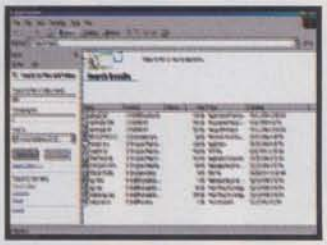
The battle for enterprise OSes is set to heat up this year, when both Microsoft and Novell release long-awaited upgrades.

In late December, Microsoft released the code for Windows 2000 to manufacturers, locking the product into a planned February 17 release date.

The release to manufacturing has been a long time coming. Components of Windows 2000 have been in development since the early 1990s and the product has suffered from repeated delays, owing largely to the complexity of developing Active Directory, Microsoft's first attempt at a full-blown directory service.

Competition in the directory space will be intense in the first part of the year. Novell, Microsoft's chief rival in the directory space, released the next upgrade to NetWare 5.1 (codenamed Cobra) in mid-January. Novell has much more experience in the directory market, but Microsoft may have an advantage in the Windows brand name.

Despite the competition, Microsoft officials have said that the marketing effort for Windows 2000 won't be as intense as the legendary Windows 95 launch. Initially, Microsoft will concentrate on enterprise customers, although the first volume sales are likely to be to early adopters keen to try out the new OS. And enterprise sales will be a hard slog; Gartner has predicted that up to 70% of large corporates will skip the first release.



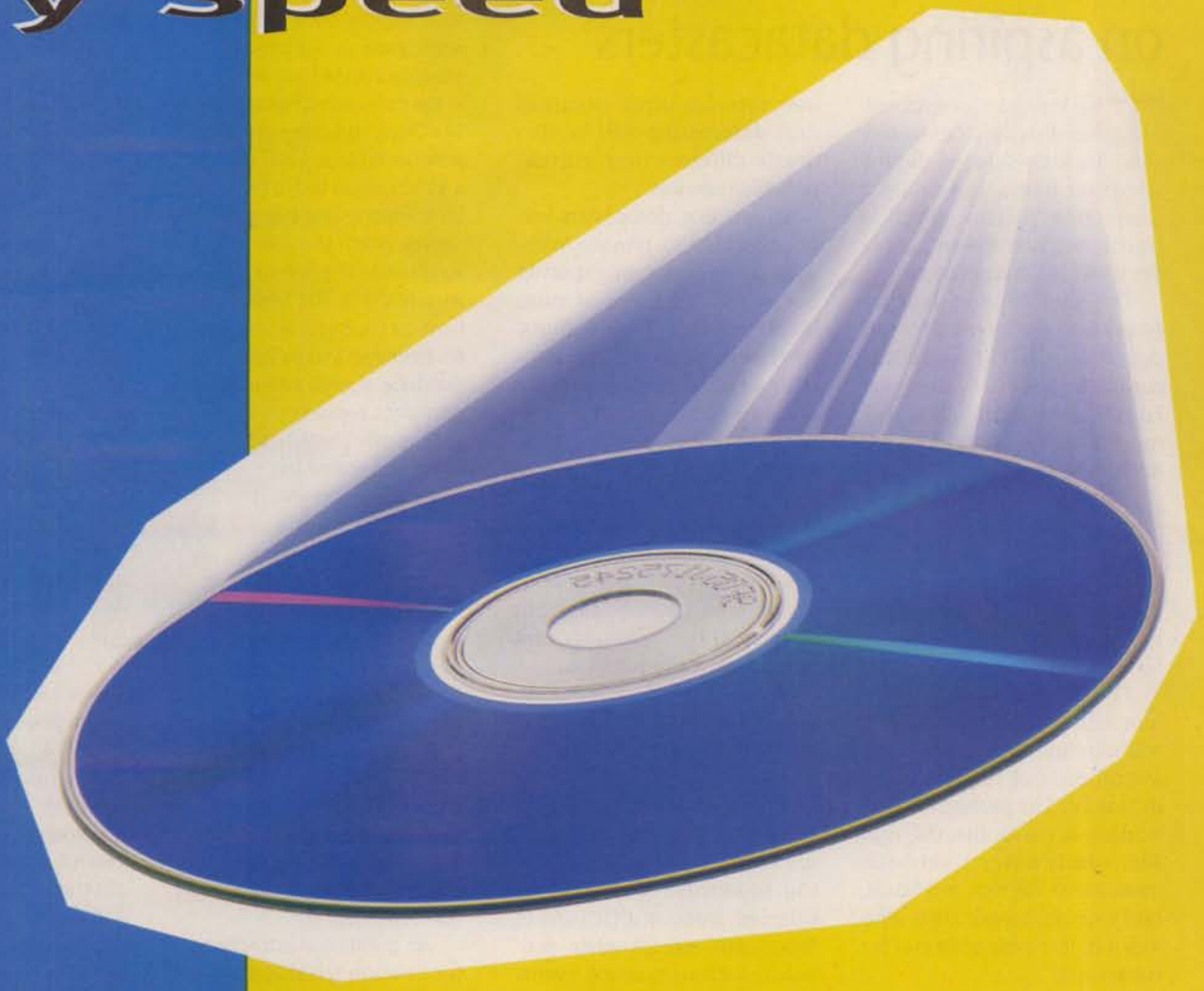
Upgrades from Windows NT will cost $259, while Windows 95 and 98 users will be charged $379.

Angus Kidman

News Roundup

- Despite continued profit growth and increasing interest in the Net, Telstra's growth rate is likely to slow down, CEO Ziggy Switkowski has warned. In a memo distributed to all staff, Switkowski praised the benefits of competition to consumers but said that it would impact on Telstra's profitability. The announcement quickly drove down Telstra's stock price.
- Australia's struggling technology venture capital industry was given another boost in December with the launch of ePark, an incubator exclusively for fledgling Internet companies. A joint venture between consultancy Deloitte Touche Tohmatsu and venture capital firm Allen & Buckeridge, ePark is billing itself as a "virtual accelerator" for .com companies. In addition to providing early stage capital, ePark will provide Net hopefuls with professional resources. Of the 500 companies ePark plans to screen each year, 25 will be admitted to the incubator program. The goal of ePark is to see each business progress from the startup phase to an IPO within three years.
- According to figures released by the Australian Bureau of Statistics (ABS), nearly 75% of government organisations had Internet access by the end of June 1998. The highest level was recorded by Federal Government, where all departments and agencies had Internet access. The ABS estimated that 88% of all government organisations would be online by June 1999.

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DIGITAL TV DECISION

Government cracks down on aspiring datacasters

The Federal Government has finally announced its long-delayed digital television plans, unveiling a compromise package which is heavily weighted towards existing television broadcasters.

The plan requires existing broadcasters to offer both high definition (HDTV) and standard definition (SDTV) formats. Each channel must offer a permanent SDTV signal, plus 20 hours a week of programming produced in HDTV. SBS will be allowed to convert SDTV programs to HDTV to meet that quota. The plan runs against the Productivity Commission's recommendation that only SDTV be required.

The plan has proven unpopular with broadcasters, since it will substantially increase their overall costs of implementing digital TV. The problem is particularly acute for the ABC and SBS, which haven't yet been guaranteed the required funds, and regional broadcasters who face a higher per-capita cost for conversion.

However, a sop to broadcasters will be the ban on virtually all forms of existing television programs by aspiring datacasters such as Fairfax and News Ltd. Government officials said that the purpose of the new rules was to "provide more certainty about the scope of these new services while ensuring that datacasting will be distinctly different from current television services".

In practice, datacasters will only be able to provide Web-style content. Genres explicitly banned under the new rules include drama, current affairs, sport broadcasts, music, infotainment and lifestyle, comedy, documentaries, reality television, children's programs, light entertainment, compilations, quiz programs and game shows. Conventional TV-style news broadcasts are not permitted, but individual news stories are allowed, provided they are not hosted by a presenter and not linked to another item.

Although this effectively bars datacasters from competing with television, TV stations will be allowed to include datacasting-style features such as additional information or multiple camera angles in a sporting broadcast. They will be banned from multichannel broadcasts, except when programs such as sporting events run over time. A final policy on multichannel broadcasts for the ABC and SBS, both of which would like to offer additional channels, is yet to be decided. Spectrum allocation for the new channels is due to be completed in the first half of 2000.

Angus Kidman

Cashbook

The acquisitions group at accounting software and application service provider Solution 6 didn't get much rest in the run-up to Christmas. In late December, the company announced that it was making a $150 million bid to purchase US company Elite Information Group, which provides solutions to the financial and legal markets. The news came hard on the heels of Solution 6's intended $40 million purchase of legal information provider Lawpoint.



The offer, which is being supported by Elite's management, is for $US11 a share, a 44% premium on the last month's average trading price.

Solution 6's background is largely in the financial sector, but it has shown an increasing interest in the legal market this year. Like Solution 6, Elite has its roots in a single vertical market software base. It has also dabbled in the ASP market, helping to found legal ASP Serengeti.

An additional attraction for Solution 6 is that the company is already Nasdaq listed. Attempts by Solution 6 in early 1999 to acquire listed software developer PC DOCS, which would have facilitated its listing in the US, eventually fell through, although Solution 6 did purchase PC DOCS' legal software arm, CMS Data. Tyler has said that Solution 6 still intends to pursue a Nasdaq listing.

Solution 6 plans to fund the acquisition through a new share placement, and with a further investment by Telstra. Telstra has increased its holding in the company to 24%, pushing the telco's total investment in the company to $100 million. Telstra had purchased a 15% stake in the company in August.

Telstra will pay just $3.50 a share to purchase an additional 14.3 million shares. Before being suspended pending the Telstra announcement, Solution 6 shares were trading at $11.44. Telstra's saving by buying at the option price amounted to a colossal $113 million — more than its total investment in the company. Telstra is also appointing executives Lindsay Yelland, group managing director of business solutions, and Andrew Day, CEO of Pacific Access, to the Solution 6 board.

For up-to-the-minute financial news from the IT sector, check out Newswire's continuously updated Cashbook service at http://newswire.com.au/cashbook/.

News Roundup

- The Australian Computer Society (ACS) became the first IT organisation in the world to be recognised as a professional body when it was admitted to the Australian Council of Professions (ACP) in December. Representing Australian professionals since 1971, the ACP's main objective is to maintain and advance the standard and status of professionals within the community. With ACS being granted ACP membership, those employed in the IT industry are placed in the same league as doctors, accountants and engineers, all of whom are already considered professionals. Being regarded as a profession will lend a degree of credibility to the IT industry, according to the ACS.
- The Federal Government is contributing $171 million for rural IT&T schemes across Australia. The payout includes $70 million for rural networking, $45 million for local governments, $36 million for regional Internet access, and $20 million for island communities. The funds will be distributed through the Networking the Nation scheme. Applications for the first round of funding close on March 8.

For complete versions of these and many other stories, be sure to check into http://newswire.com.au.

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SONY.

* When using MSA-16A (16MB)

Wireless access is being eagerly embraced by financial institutions, but technical questions remain.

Can you bank on WAP?

Wireless application protocol (WAP) — which allows a variety of services to be accessed by mobile phones and other devices — is being pushed heavily by mobile phone manufacturers as the next major content platform. That effort is being backed by a number of groups, notably publishers and financial institutions, but several questions about the technical standards underpinning WAP remain.

Carriers are hoping WAP will cause a rapid uptake in the use of online services in Australia. "There are over 6.2 million people with mobile phones in Australia and the market is expected to grow by 30% next year. "[WAP] clearly signals the future direction of banking," said Westpac's head of Internet services, Jonathan Poole.

Even supporters of WAP say there are still compatibility issues to be solved before the standard takes off. Members of the global WAP Forum met in Sydney in December to discuss the protocol and demonstrate new WAP technology. Attending the event was the WAP Forum Board of Directors, including new CEO Scott Goldman and chairperson Greg Williams.

Williams said that the group is "working hard" to solve compatibility problems with the new WAP. The first step has been to select a consortium, called the Open Group, which will develop formal tests for mobile phone and other WAP products.

The WAP Forum is also working on new interoperability standards, which are due to be released this month. These standards will address compatibility problems between different WAP phones and gateways. As a result, mobile phone vendors will need to submit their handsets to a rigorous testing procedure.

Vendors are staying tight-lipped about this process; a Nokia spokesperson declined to comment when asked if Nokia phones will work with Ericsson WAP gateways. "There are very major issues being defined at the moment. One is interoperability," he told *APC*.

The WAP Forum has also begun working with the World Wide Web Consortium to include WAP in global Web specifications. The first project will be to incorporate WAP's Wireless Markup Language (WML) into the new Web standard called XHTML.

The conference also officially launched WAP version 1.2. This version will eventually include new features such as billing, improved display on mobile phones and the ability to buy and sell items. "It's very important for us that you can order from your WAP phone," said Andre Meyer from French carrier Cegetel.

Other businesses are also working on ways to optimise WAP for a variety of devices. Oracle has demonstrated its new Portal-to-Go, which uses XML to make Internet content available on a number of different devices. The system can convert Web content for WAP, HTML, handheld devices and VoxML.

CMG Telecommunications is also working on a product that allows digital phones without WAP to access the Internet. The WAP Service Broker converts WAP content to SMS text messages, which can be read by most digital phones. Optus is already using the WAP Service Broker in Australia for its WAP trial.

Both Telstra and Optus have begun trials of WAP services. Mobile phone vendors are also starting to push WAP in Australia with advertisements beginning to appear in magazines and on billboards.

Banks have been particularly enthusiastic in pursuing WAP. Westpac has been conducting its own trial using WAP for Internet banking. The service allows customers to access bank accounts and transfer funds using their mobile phone. Customers can already sign up for the service on Westpac's Internet site. The WAP service is scheduled to begin full operation "early in the year 2000". Meanwhile, Westpac is planning extra features, such as messages to alert customers about credit card payments or share prices.

National Australia Bank has joined Westpac in the race. It began trials of WAP mobile banking late last year, and has already tested the service with a number of carriers. It eventually chose Optus to host its WAP gateway, whereas Westpac has signed with Telstra.

National officials said they are "continuing negotiations" with other carriers to provide WAP banking services. It is understood the National does not want to prevent customers who do not use Optus from using WAP banking.



WAP banking will allow customers to access bank accounts and transfer funds from their digital mobile phones. Customers will need WAP-enabled handsets, and will pay by the minute once the service is officially launched.

Not all banks are so enthusiastic. The Commonwealth Bank has voiced concerns about WAP. General manager of Internet banking Stephen Coulter said that WAP isn't ready to be used to access bank accounts or transfer funds. He also claimed there are reliability problems with "hundreds" of WAP handsets arriving in Australia.

The Commonwealth Bank has decided not to use WAP for its MobileBank trial, which began in late November. MobileBank uses the Short Message Service (SMS), which can send encrypted text messages. A special SIM card is also needed for MobileBank customers to check account balances, transfer funds and pay bills using BPay. The service is free until March 31.

Coulter said the system must guarantee complete security and privacy for customer accounts. "The current WAP technology doesn't support that," he said.

Coulter also claimed WAP is too expensive for most customers. WAP customers are charged for each minute they stay online, while SMS users only pay for each message. "[WAP] does require affordability of handsets and [more] bandwidth," he said.

Nevertheless, some WAP services will support both protocols. Ericsson and Nokia both sell WAP gateways that can transmit information to mobile phones using SMS or WAP. "It's not a Beta/VHS argument, because they both work on the same technology," said Coulter.

William Maher



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FirstTake

Red Hat Linux 6.1 and Corel Linux OS

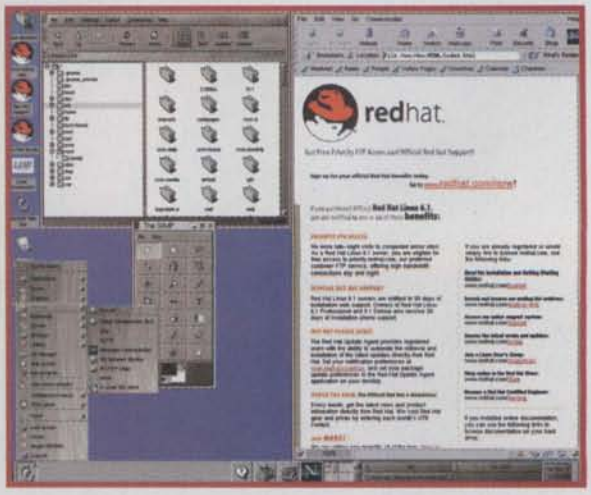
It's becoming increasingly evident that Linux caught most analysts completely by surprise. First it was an operating system that had no hope, then an unscalable mid-range server OS destined to a niche of the market, and now it's a viable competitor to NT in the server space. Most analysts still maintain that it has no chance on the desktop. Judging by the latest releases from Red Hat and Corel, there are some who beg to differ.

As the first big software company to produce a Linux distribution (before the Red Hat IPO, that is), a lot was expected from Corel's version of Linux. It was originally announced as a Linux distribution that was intended to be as easy to use as Windows. Corel has come close, but since the announcement, other vendors have also done a lot to improve the usability of Linux.

Originally, *APC* wasn't even going to review Red Hat 6.1 — after all, it is just a point release. Then we tried it: it should have been called Red Hat 7, it is such a significant upgrade. On the other hand, the update from version 5 to 6 was mostly a package refresh. We're still trying to fathom Red Hat's version numbering system.

Gone now are the text-based install procedures, almost random menu creation and sometimes poor integration. With the exception of the first screen, the installation is entirely graphical, with icons, useful help text and an integrated partitioning tool (which can even set up software RAID devices). Hardware is autodetected — a task that the installation did very successfully, with the exception of the network card in the system. The distribution also installs a hardware daemon, which detects new hardware and installs appropriate software, bringing Linux that much closer to Windows' plug and play architecture.

Corel also uses a graphical installation, but this is not nearly as polished as Red Hat's. A year ago, it might have been revolutionary, but now it just looks average. Most annoying was the very poor partitioning tool — it couldn't see the logical drives on the hard disk, instead viewing the extended partition as a single logical drive. Given our plan to install it onto a logical drive, we weren't very happy. There are two basic solutions — have a separate physical drive for the partition, or just leave some unpartitioned space into which to install Corel. Or you could just let it format your hard disk completely when it performs a standard install. Corel also has the ability to install into a FAT partition, but it's not recommended.



Both Corel and Red Hat have pursued the Windows strategy of providing a set of standard install packages (such as Desktop or Server) or giving the user the option to customise which applications and packages are installed. Again, Red Hat shines through with a much better customisation interface than Corel. Corel's Linux doesn't even provide default options, requiring you to go through and select every package, even core packages, individually.

Finally, while Red Hat provides the option of installing LILO (Linux Loader) into the master boot record or at the start of the Linux partition, Corel arbitrarily overwrites the system's boot manager with its own boot manager. Fortunately, we had a copy of PowerQuest's BootMagic that we reinstalled over the Corel boot manager.

Once installed, both products are a vast improvement on previous distributions of Linux. They can both be easily configured to boot into the X Window System by default (Corel actually gives no choice but to do so), and you should never have reason to drop into a console unless you want to do something tricky. Even manual mounting of floppy drives and CD-ROMs is no longer required.

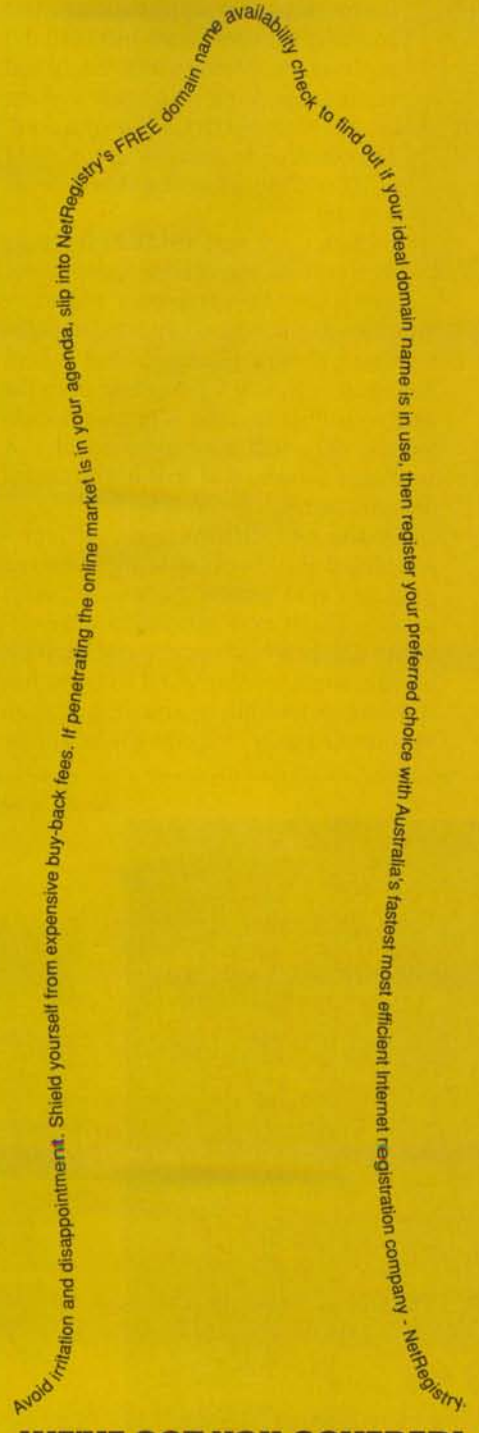
Red Hat can be installed with both KDE and Gnome libraries (the standard install only includes Gnome), and uses Enlightenment as its primary Window manager. Its menu configuration is much more intelligent than that of previous versions, and its entries actually depend on your install options (in the previous version, stuff you hadn't even installed appeared). The Windows Explorer-like tool is first class, as are the control tools, and the installation even includes an application for simplifying one of the bugbears of previous versions: setting up PPP Internet connections.

Selecting an Enlightenment/GTK theme is simple. A good set of themes are provided by default, and configuring everything else was also quite simple. If there is a criticism to be made of Red Hat, it's that there are too many control panels scattered around, and many of them are redundant. A more focused control panel system would be an improvement.

Corel's Linux, which is based on the Debian distribution and KDE, is mostly an attempt to copy the Windows interface, and it has a default setup looking very much like Windows 95. Obviously, for Corel, easy to use means being just like Windows. There are some nice additions to the Linux world (mostly copied from Windows features) which we hope will filter into other distributions, but we'll have to wait and see if Corel allows that to happen. So far its commitment to the open source motto has been less than stellar.

Continued on page 28

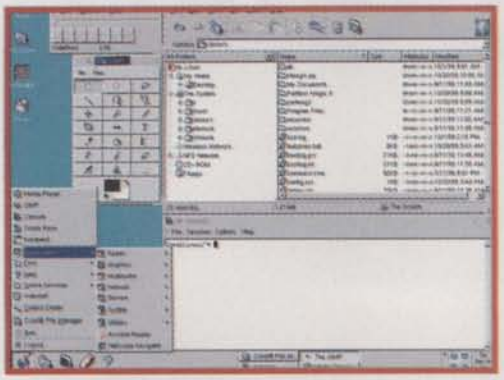
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The main attraction of Corel Linux is the Corel File Manager, which, oddly enough, looks like Windows Explorer — with Find File or Computer function and so on. One major advantage it has over Red Hat is that it shows shared PCs on the network, working seamlessly through Samba and NFS. Physical and logical drives are arranged in a similar fashion to Windows, with DOS-style drive lettering, and NFSes attached to the PC are also viewable via this interface. Other Windows-like features are also provided with Corel Linux, such as a Run command, a Media Player and a simple KDE text editor.

Otherwise, the other installed applications are fairly standard fare, with the usual set of games and open source business applications. The downloaded version we installed did not include WordPerfect, but retail versions do come with some version of the WordPerfect suite attached. The download version is about 300M — it's not quite as comprehensive as Red Hat.

Both Corel and Red Hat also come with automated package update tools, which go to the companies' respective Web sites and download updated application and library packages and install them with minimal intervention from the user — a little like the Windows update feature, only with a lot more updates. A very cool feature, and well implemented on both counts.

Of the two distributions, *APC* preferred Red Hat, because of its improved packages and greater feature set. As a desktop OS, it now approaches the elegance and power of commercial versions of Unix such as Solaris and Irix, but has the added flexibility and application support of Linux. It's now pushing new ground. On the other hand, a Windows user might prefer Corel. Although it has done a pretty good job of mimicking the Windows interface, it adds little beyond that.

Nathan Taylor

Red Hat Linux 6.1	
Distributor	Red Hat (online), or various local distributors
Phone	N/A
Online	http://www.redhat.com/
Price	Free download
In short	A major upgrade. Elegant and easy to use.
Corel Linux OS	
Distributor	Corel
Phone	1800 658 820
Online	http://linux.corel.ca/
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Diamond Viper II

When S3 bought out Diamond Multimedia late last year, there were more than a few raised eyebrows, and worries about the future of Diamond. After all, Diamond was known for great 3D graphics cards but S3 wasn't. The Diamond Viper II is the first glimpse of the newest card from the S3/Diamond stable.

The Viper II is based on the S3 Savage2000 video chip (Diamond previously tended to base cards on a variety of chips) and 32M of SDRAM. The packaging promises unparalleled 2D and 3D graphics, but with the nVidia GeForce 256 processor already making next-generation waves, it was very interesting to see how the new card and chip fared in *APC*'s tests. The greatest innovation with the GeForce and the Savage2000 is the ability to do transform and lighting (T&L) effects with hardware, which frees up huge amounts of system resources.

Transform and lighting is one of the major stages of 3D graphics construction. T&L was described in great detail in *APC* December 1999 (Technobabble, page 151) but in summary, T&L is the section where the 3D wireframe of the image is constructed, with the lighting levels and effects computed. This intensive task function is typically performed by a computer's processor. These new cards are now able to execute it themselves, freeing the processor up for other tasks.

Like S3 Savage cards before, the Viper II features S3 texture compression (S3TC). Although is not a huge leap in terms of 3D processing, it adds some icing on the cake in terms of texture levels and overall finish. S3TC allows developers to use more levels of texture in games and applications. The detail difference with and without ST3C is highly noticeable, especially when getting close to a wall or object.



This is all well and good, but in *APC*'s tests, the card was found wanting in a few areas. To test the card, DirectX 7 and the latest drivers from Diamond were installed on a 450MHz Dell Dimension and a large set of tests were run, including 3DMark, Ziff-Davis' 3D WinMark, Quake III Timedemos (frame rate tests), Viewperf and a TreeMark.

Its OpenGL results were extremely poor, even though it claimed to deliver full hardware acceleration. In comparison to the GeForce card in Viewperf, there was a distinct failure to perform. With TreeMark (which, it should be noted, was written by nVidia and optimised for its chipsets) it was also lower than had been hoped.

In other tests, it did very well with especially high frame rates for Quake III Arena, although yet again it played second fiddle to the GeForce at higher resolutions. This is not to say that the rates achieved are no good — at 50fps at 1,024 by 768 at 16-bit colours it should keep the more discerning gameplayers sated. It is also the video card that has come closest to breaking the 1,000 barrier in Ziff-Davis 3D WinMark 99, with a score of 995. This is the only area in which it excelled.

The Viper II has three outputs: CRT, S-Video and composite video. It is ideal for watching DVDs as the video card works as a hardware DVD decoder. For TV output, the drivers include tweaks to maximise the image quality.

Darren Ellis

Diamond Viper II		Leadtek WinFast GeForce 256 (for comparison)	
Benchmark	**Result**	**Benchmark**	**Result**
Ziff-Davis 3D WinBench	995	Ziff-Davis 3D WinBench	977
Futuremark 3D Mark 99 Max	3,534	Futuremark 3D Mark 99 Max	3,685
Viewperf: Advanced Visualiser (fps)	6.03	Viewperf: Advanced Visualiser (fps)	59.1
Viewperf: DesignReview (fps)	4.43	Viewperf: DesignReview (fps)	16.5
Viewperf: Data Explorer (fps)	4.75	Viewperf: Data Explorer (fps)	15.9
Viewperf: Lightscape (fps)	0.75	Viewperf: Lightscape (fps)	2.1
Viewperf: ProCDRS (fps)	0	Viewperf: ProCDRS (fps)	7.8
Quake III at 640 by 480, 16-bit colour (fps)	63.8	Quake III at 640 by 480, 16-bit colour (fps)	62
Quake III at 1,024 by 768, 16-bit colour (fps)	50	Quake III at 1,024 by 768, 16-bit colour (fps)	55.7
Quake IIIat 1,600 by 1,200, 32-bit colour (fps)	21.9	Quake III at 1,600 by 1,200, 32-bit colour (fps)	35.3
TreeMark: simple (fps)	6.47	TreeMark: simple (fps)	42.8
TreeMark: complex (fps)	1.41	TreeMark: complex (fps)	12.2

Test system specifications: Dell Dimension XPS-450, a 450MHz Pentium II with 128M SDRAM, 10.1G IBM-DDTA-371010 hard disk drive, FAT32 file system, Toshiba DVD-ROM SD-M1202 drive, Turtle Beach Montego A3D running Windows 98. Tested using a Diamond Multimedia Viper II or a Leadtek WinFast GeForce 256.
3D WinBench and TreeMark were run at 1,024 by 768 in 16-bit colour.
Viewperf was run at 1,280 by 1,024 in 16-bit colour.
Full WinBench results can be found on this month's cover CD.
3D Mark was run at 800 by 600 in 16-bit colour.

All products used in these tests are shipping versions available to the public at the time of publication, unless otherwise stated. Winstone, WinBench and associated programs are registered trademarks of Ziff-Davis Inc. These tests were performed without independent verification by Ziff-Davis, and Ziff-Davis makes no representations as to the results.

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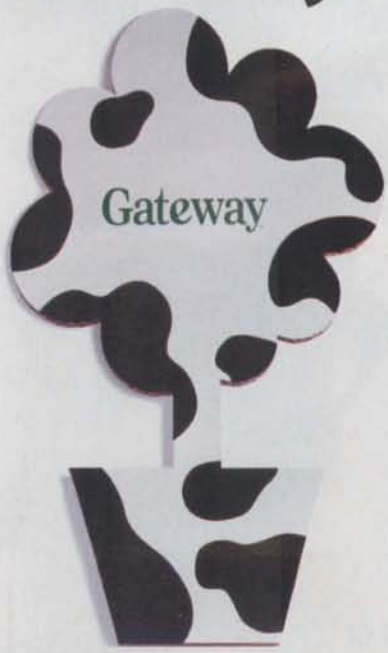
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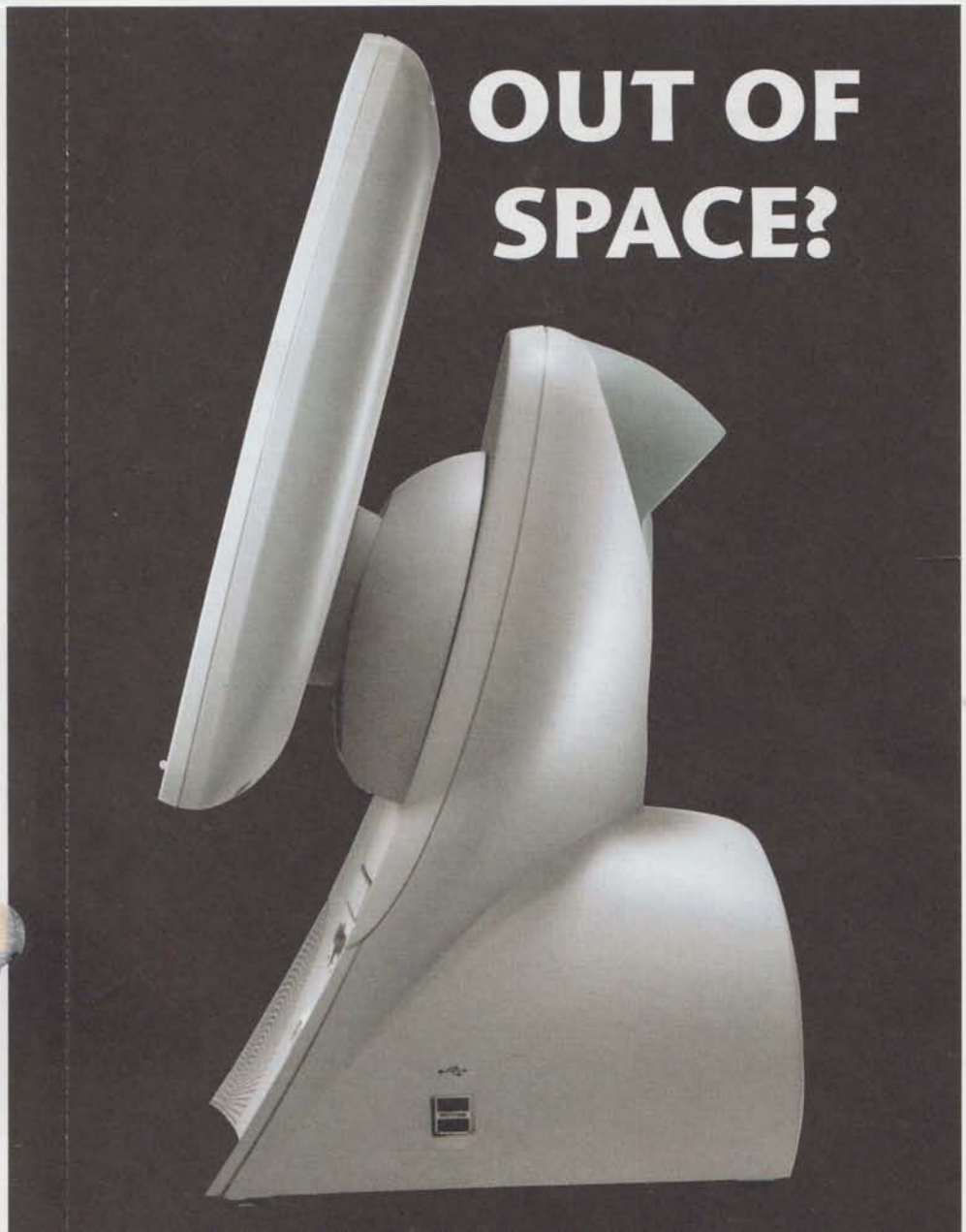
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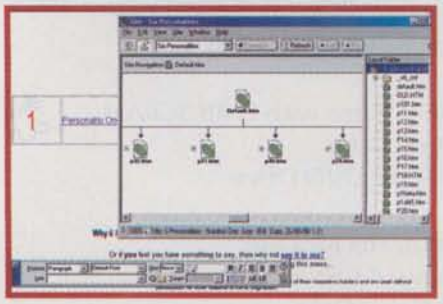
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Macromedia Dreamweaver 3 and Fireworks 3

The previous releases of Dreamweaver and Fireworks have both been exceptionally good at what they do. Dreamweaver 2.0 won Editor's Choice for best HTML package (see *APC*, August 1999, page 94), and Fireworks 2.0 rated highly (see *APC* June 1999, page 44) as a feature-rich image optimisation package. Do the new releases add up to a winning formula, and are they worth upgrading to?

If you've used Dreamweaver before, you'll initially be a little underwhelmed by the new version, as a lot of the changes are behind the scenes. This is a good thing, though, as Dreamweaver has always had an excellent, uncluttered interface. You



certainly don't need to worry about learning a whole new methodology, as all the major features of Dreamweaver 2 are still in exactly the same locations, albeit with a few new tweaks.

Speaking of tweaks, Dreamweaver 3 introduces a terrific new concept. Dreamweaver already had a fairly comprehensive facility for cleaning up dodgy HTML. Macromedia has taken it one step further with the inclusion of a command to clean up HTML created by Microsoft Word. If you've ever looked at the abomination that is Word HTML, you'll understand what a great feature this is. Working with a sample Word 2000-generated HTML file, *APC* was able to cut a file down from 1,100 lines to 634 lines, with cleaner, more stable code as well. A document created in Word 97, comprising 123 lines of HTML code, went down to 65. Word's facility to save as HTML is nice — and Dreamweaver makes it useful, too.

The other major improvement in Dreamweaver 3 is the inclusion of a visual and recordable history list. The neat thing about this is that it enables you to redo and undo selectively, skipping and or including previous steps at will. The whole shebang can then be saved as an action, and even added as a menu command. The entire Dreamweaver interface (and yes, we do mean the entire interface) can be customised to particular needs using XML to adjust the level of command availability. This gives the potential user a lot of power — although, of course, it'll take you a little time to get everything just right.

Dreamweaver has always been easy to configure with other Web tools, from defining image editors to choosing external text editors. In the case of Dreamweaver 3 this is still true, although with the improved code interface, which now includes line numbering, there's even less reason to need an external text editor.

If all this complexity sounds daunting, don't worry. Even though Macromedia pushes Dreamweaver at Web professionals, the simplicity of the interface means that (as long as you can cover the entry price) even new users can quickly create great-looking sites. To aid Web novices, Dreamweaver 3 includes a visual tag editor that allows tags to be built menu-style, from within a page.

The other half of the new package is Fireworks 3. In combination with Dreamweaver, Fireworks is exceptional. Even by itself, Fireworks is an impressive package, and Fireworks 3 has some significant new improvements. Unlike Dreamweaver 3, though, the improvements are obvious. One criticism of Fireworks 2 is that the optimisation utilities were part of the export process. This means that if you want to change a detail, then check optimisation, you have to start the export process, then flip back for further changes. Thankfully, optimisation in Fireworks takes place as part of the main screen, in much the same way as in Adobe's ImageReady. Image optimisation was reasonably painless, and



worked to much the same level as Fireworks 2. We took a sample 80K image, and could quickly drop it to 20K without visible quality loss.

The usual range of effects and tools are present, but it's still far from being a complete graphics package. You'll still want to create images elsewhere and then optimise with Fireworks.

Like Dreamweaver 3, Fireworks 3 uses a visual history list, and here the benefits of being able to save common command sequences is even more evident. You can take a general setting for images and simply create a menu command of as many (or few) steps as you like.



Dreamweaver can launch just the Fireworks export module with default optimisation utilities, which certainly saves time. Both applications are somewhat slow loading, especially on lower-end systems, but they are actually a touch quicker running than they used to be, once loaded.

Macromedia has taken two good Net tools and made them better. With their high price tags, they're professional-level tools that actually deliver the goods. The improvements over the version 2 releases of both packages are solid and make both packages worthy of purchase.

Alex Kidman

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PocketMail

PocketMail is a low-cost mobile email service for people who travel or can't be bothered with modems or notebook computers.

The service allows email messages to be sent from specially equipped organisers or handheld computers. Simply hold the device against a landline or mobile phone, and it will send and receive email.

The system works via a small device called an acoustic coupler. The acoustic coupler converts the data into acoustic signals and sends them down the phone line. The signal is converted back to data at PocketMail headquarters and sent over the Web.

Using PocketMail is easy enough. Simply dial a 1300 phone number and hold the organiser up to the handset when prompted. When the PocketMail button is pressed, the device sends any messages waiting in its outbox and checks for new mail.

Apart from a couple of false starts (the handset wasn't aligned correctly), the process went without a hitch. It took less than 20 seconds to send five emails, and later, another 40 seconds to receive each reply. Replies can also be automatically forwarded to another email address.

Like most email services, PocketMail includes spam filters, address blocking and password protection. If you have several other email accounts, they can also be forwarded to the PocketMail mailbox.

Travellers will find PocketMail quite useful, as long as they can dial a PocketMail service in their area. PocketMail is also being pitched at the elderly and those people who either don't want or can't afford a computer with Internet access.

PocketMail will be promoted for mobile banking and other applications. However, it's hard to see this becoming popular, considering the imminent arrival of WAP phones.

PocketMail's major advantage over WAP-equipped mobile phones, which boast email and Internet access, is that it's easy to use. Not only are PocketMail devices extremely simple to use, they also have much larger screens and keyboards. This is also PocketMail's only advantage over the Short Message Service (SMS), which already allows most mobile phones to send short text messages.

APC wasn't able to test PocketMail using a digital mobile phone. The first GSM-compatible PocketMail devices



should be available here by the time you read this. They will be different to the prototype version *APC* tested.

PocketMail's advantages may not last long. Smartphones featuring larger screens, graphics and more memory are already beginning to hit the shops. However, if you are looking for a separate organiser, PocketMail could be a handy addition.

William Maher

Distributor	PocketMail
Phone	(02) 9234 0000
Online	http://www.pocketmail.com.au/
Price	Oregon Scientific PM-32 $249; PocketMail Backflip $199; monthly access $15
In short	Great idea if you use an organiser.

Sony DPP-MS300E printer

With an eye to the impatient or technophobic customer, Sony has designed a printer which cuts out the tedious download-to-PC stage between shooting a digital image and printing it — all you need is a camera and the printer.

The DPP-MS300E uses dye sublimation on specially coated paper, and although it only uses a 306dpi maximum resolution, it produces impressive quality prints with excellent clarity and deep, rich colours. The single size paper comes in standard 141 by 100mm postcard size, and it has rather generous margins, leaving the maximum image size at 114 by 85mm. The print method uses a three-colour RGB transfer ribbon which requires three passes under the transfer element. This ribbon lasts for 50 prints, no matter what colour or density.

Two memory slots sit on the front of the printer for either Sony's Memory Stick or standard PC Card format (to take SmartMedia or CompactFlash cards using an adaptor). On the left side are inputs for S-Video and RCA video in and out for video still capture. Parallel in and power supply sockets complete I/O on the back. Button controls on the top allow the user to select from video, PC input or RAM card images, as well as add a date imprint. The main input is a circular dial which allows you to choose the number of prints on a sheet, orientation, print a calendar or produce an index sheet. Also on the top panel are action controls for picture select, capture and print, plus a scroll-jog dial to select the image required.

The downside for users of the DPP-MS300E is you don't get to see the image until it is printed. If you wade through the complex and sometimes confusing dial, enter, select, print and action procedure, allied with a series of less than informative beep feedback codes, you will probably wish for a PC to help sort it all out. All that would be required is a simple top-panel LCD offering image number, or better still an LCD image display, and all would be rosy. As things are, it is rather frustrating. This is exacerbated by the slowish print time of about two minutes and 14 seconds for a postcard, plus an additional 30 seconds to download images from the memory card or stick. Printing from a PC is faster, at about two minutes and 12 seconds, but if you take this route then why bother with the direct print option at all? The DPP-MS300E will be a good concept when it is finished.

Jeremy Torr

Distributor	Sony Australia
Phone	(02) 9887 6666
Online	http://www.sony.com/
Price	$1,299
In short	Really good idea, ideal for the technophobic user. Sadly, all rather pointless without an LCD.



1440 DPI, Drop Modulation Technology

and Individual Ink Tanks.

If you demand speed, quality and economy from your printer, *look no further than* the new Canon BJC™-6000.

New see-through ink tanks. What really distinguishes the BJC-6000 is the new ink tank system. For better operating economy there are individual see-through ink tanks for all colours. Each is separate from the print heads, significantly reducing operating costs and allowing you to replace only the empty tank.



The think tank system. Each ink tank has a prism moulded into the bottom. A beam of light measures ink status, and a monitor in the printer driver keeps users up to date on the amount of ink remaining in each cartridge.

More life-like colour. An all-new driver emphasises colours as they are perceived by the human eye. The result is natural colours with more subtle variations in dark shaded regions, and better gradations in highlighted areas. PhotoRealism with a six-colour ink system and Drop Modulation further enhance quality, even on plain paper.

1440 X 720 dpi. Drop Modulation Technology™ generates droplets around one-third the size of conventional droplets giving you high resolution printing at 1440 X 720 dpi. The result is a sharper image with smoother tonal gradations.

Sharper Black Text. Drop Modulation Technology is now available for the first time with a black cartridge to help eliminate grain in text. At the same time newly developed black ink gives sharper, clearer text with improved water resistance.

New, high-performance engine. An innovative new engine design provides the fastest print speeds, in both black & white and colour, of any Canon Bubble Jet printer.

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support. Drivers are available for Windows® 95/98/NT and an optional USB conversion kit is available with drivers for Windows 98, iMac and Mac G3.

If you are looking for performance and economy, you've found it in the new BJC-6000. For more information please call us on 1 800 021 167.

Photo Realism™

New BJC-6000 – $549RRP

Canon

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CS/8259

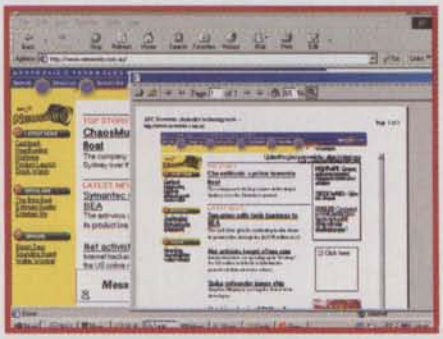
Internet Explorer 5.5

Netscape may be putting out single-point releases, but Microsoft isn't afraid to step up to the plate with larger release jumps, and that takes real guts, especially if you're not delivering a great deal. From what we could see of the beta release of Internet Explorer 5.5, Microsoft still has some work to do in order to impress the masses.

Installation of the beta release was fairly painless, although Microsoft have opted for the 'download a 500K executable which then downloads the rest' model, which can be frustrating on a slow connection. As part of the install, Windows Upgrade also ran, which fixed a few other issues on the test machine, but it's unclear whether this will be a mandatory part of the final release.

The one major feature that is evident when looking at Internet Explorer 5.5 is the print preview feature. This is reasonably neat, although it has problems when dealing with frames — it would be nice to have a print preview that can assemble an entire page for printing every time, but in *APC*'s tests IE 5.5 tended to render most framed pages with individual printable pages for each frame. This is fine if all you need is content printed, but pointless if you want to create a proper visual representation of a Web site. You could always do a screen-dump, but that rather defeats the purpose of having a print preview in the first place.

As far as the rest of the browser goes, there are few visual differences. Microsoft needs to put more work into the rendering engine, as we found numerous images (especially animated GIFs, for



some reason) that failed to render properly, if at all. Otherwise IE5 was reasonably stable for a beta release. Its capacity to override other applications when loading pages was slightly annoying, as it led to some typing inadvertently moving from one program to another.

One of the theoretical aims with IE5.5 is heavy integration with Windows Millennium edition (whenever that arrives), and as such there's a lot of functionality that is yet to be added. There's also a slew of features that are 'supported', but not really coded by anyone yet, such as vertical text capabilities and some DHTML effects. Time will tell, of course, whether these are useful and adopted, or dinky and ditched. An odd side effect of installing the browser was that the test system was convinced it *was* running Windows Millennium as far as help info was concerned.

Ultimately, of course, IE5.5 will probably be adopted by those who simply must, must have the latest browser updates. If the concept of a print preview excites you, then it's certainly worth a look once it reaches final release.

Alex Kidman

Distributor	Microsoft
Online	http://www.microsoft.com/windows/ie/
Price	Free
In short	A promising beta, but not heavy on new features yet.

FastPoint PXL-2000 hub and light pen

Somewhat like gaming guns, light pens use the scan of the electron beam in your monitor to determine which part of the screen they are currently pointing at. This provides screen resolution positional data that can be used to position the cursor just like a mouse. One of the more recent products in this market is the FastPoint Technologies' range of light pens, designed for use in a wide range of situations.

FastPoint has a wide range of pens, from standard pens to heavy-duty, stainless steel models with armoured cables for use in industrial situations. To interface with the computer, it has both internal PCI card interfaces and external USB-connected units.

APC tested its PXL-2000 external unit with a basic USB pen with a touch-sensitive tip and an additional side button. This connected via two cables: a USB connection and a Y-cable that joins the link between the computer and the monitor. The PXL-2000 hub version also includes four downstream USB ports.

Installation was surprisingly easy. Install the Y-cable between the monitor and computer. Connect the USB cable to an available port, and plug in the light pen.

The controller comes with a power adaptor. Without it, power is drawn from the USB port, which means it can't supply power to its additional USB ports. Using the power adaptor, the extra USB ports are fully powered. It really comes down to whether you need the additional ports or not. Although it has USB connectors, Macs are not supported.

The installation under Windows 98 was quick and painless, with a simple calibration to finish off the exercise. The light pen provided a convenient way of interacting with the computer. Admittedly, you wouldn't want to use one for too long, because holding your arm up to a screen for a long time is tiring. However, it does provide a good substitute for a mouse, especially in imaging applications.

One of the better applications for the lightpen comes from the fact that it can work at some distance from the screen. It could be used with monitors encased the monitor behind glass or perspex. The FastPoint lightpen is easy to use and effective.

Wayne Cosshall

Distributor	None in Australia yet
Online	http://www.fastpoint.com/
Price	PXL-2000 hub $US288; pens $US199 to $US334
In short	The pen may be mightier than the mouse.



Australia's most popular printer for home and small offices combines exceptional value, with outstanding performance.

Use 75% less ink. Super Economy mode reduces ink consumption by 75% compared to Standard mode, and works for both black and white and colour. Combined with an optional high capacity, black ink cartridge, it can print up to 2400 pages in black and white, and up to 400 in colour using standard inks*. That's anywhere from two to five times the output of any direct competitor!

Photo quality printing. There are three colour print modes – Normal, Fine and Photo. Photo mode emphasises highlights and contrasts, and improves half-tones by producing richer blacks. Or, using the optional black ink cartridge, you can convert the BJC™-265SP to a fast B&W printer.



Brilliant colour, super economy, optional PhotoRealism, better Internet printing,

all for just $149.

Optional PhotoRealism™ To this Canon adds the option of PhotoRealism inks, for photographic reproduction approaching silver halide quality. It produces up to four times the colour combinations of conventional CMY printers, for smoother colour gradations and more accurate colours in skin tones and other light shades.

Better Internet images. Image Optimisation takes low resolution Internet images (typically 72 dpi), and prints them at the highest resolution supported by the printer to reduce jagged edges and pixelisation.

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support. Drivers are available for Windows® 3.1x/95/98 and Windows NT. The BJC-265SP offers exceptional operating economy plus high quality colour printing, for just $149. For more information call 1 800 021 167.





Photo Realism™

BJC-265SP colour Bubble Jet™ printer – $149RRP

Canon

* Based on 5% page coverage for B&W and 7.5% coverage for colour, Super Economy not available with PhotoRealism inks. Price shown is the recommended retail price including tax. Canon and the Canon logo are registered trademarks and BJC, Bubble Jet and PhotoRealism are trademarks of Canon Inc. Windows is a trademark of Microsoft Corp. in the U.S. and other countries. Canon Australia Pty Ltd, ACN 005 002 951.

CS8409

Wacom Graphire

A mouse is sometimes inadequate for creating artwork in programs like Photoshop or Painter. A pen is a more natural fit, especially for anyone with classical art training. The pressure sensitivity that most pens offer allows for more natural drawing motions and allows lines to vary in width as you press with varying pressure.

Wacom's Graphire tablet aims to be a full mouse replacement system. It includes a pressure-sensitive pen, a mouse with two buttons and a scroll-wheel as a third button. Both the pen and mouse are cordless, making them light and easy to use. The supplied mouse never needs cleaning because there is no ball to pick up dust. The three buttons are fully configurable and can easily be set up for left or right-handed use.

The tablet provides an adequate active drawing area of 10 by 13cm and has a clear plastic overlay, which allows you to easily trace from a paper original. It uses a USB interface to connect to the host computer and as a source of power.

The pen has a pressure-sensitive tip, which has 512 levels of pressure, as well as two side buttons and a pressure-sensitive eraser. With the right software, this means you can use your tablet and pen like a conventional pencil with an eraser end.

Installation was easy. It plugged into a USB port, the software was installed and it worked. Wacom's drivers and control panels allow full configuration of the tablet, pen and mouse. Wacom also supplies plug-ins for Photoshop and compatible applications called PenTools, which provide extra drawing functions.



MetaCreations' Painter Classic is also supplied with the tablet, as is Para-Graph's PenOffice SE for Windows, which has the ability to handwrite and draw notes and diagrams, mark up Microsoft Word documents and create handwritten 'sticky' notes.

The USB Wacom Graphire supports both Mac and Windows. A serial version is also available, which can only be connected to Windows PCs.

Wayne Cosshall

Distributor	Videobytes
Phone	(03) 9348 9177
Online	http://videobytes.com.au/
Price	$199
In short	Highly recommended.

Transcom Beeline

Searching for something obscure or a little out of the ordinary on the Net can be a truly frustrating experience when you are forced to wade through piles of guff, gobbledygook and porn. After an hour of browsing through dead links and useless opinions you try another search engine, only to meet with a different set of pointless drivel.

Wouldn't it be marvellous if there was a tool that helped you use multiple search engines at the same time and intelligently sorted through the results to find you the most relevant results? There is. It's called a metasearch engine, and several metasearch engines are available free on the Web; try http://www.savvysearch.com/ or http://www.metasearch.com/. For those using Mac OS there's Sherlock, which even has specialised searches to find you the best price on a product you're looking for. And then there's Transcom Beeline.

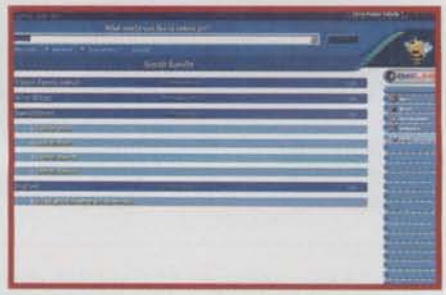
Beeline is a good idea. It searches through multiple search engines and compiles the results. You can search for Web pages, breaking news articles, newsgroups, email addresses and downloadable software. The Web search and breaking news search are quite impressive, looking at 23 and 10 search engines respectively. The newsgroup search is the least impressive; these functions look at only two engines. Beeline lets you save your searches and view them offline. The list of search engines can be updated from Transcom's Web site, which takes about five minutes.

Beeline has a major flaw; it doesn't sort results by relevance. It merely presents you with a list of the search engines it queried, and then lists the results it received from each one. With most metasearch engines, if the same page is returned from multiple search engines, the search engine will present that page first, since it is most likely to be relevant. Since Beeline doesn't do this, you have to trawl through all the results from up to 23 search engines, instead of just one. This may give you more results to work from, but it also gives you more work.

This is not the only way in which Beeline fails to live up to expectations. The box proclaims "Turn banner advertising off!", but this merely refers to your ability to turn off the banner ad in the Transcom Beeline window. The banner ads are still there in all the search engines you look at. Also, no matter how hard we tried, we couldn't get the email address search to work. Regardless of which name we searched on, Beeline only ever came up with email addresses for Mr Albert Cipolloni, who lives in Pennsylvania and may or may not be related to Emanuele Cipolloni, one of the co-authors of Beeline.

Josh Mehlman

Distributor	313 Distribution
Phone	(02) 9900 5360
Online	http://www.313.com.au/
Price	$59
In short	Don't waste your money.





Whether you judge it on features, performance or price, the new BJC-2000SP is

amazing value for money.

The new BJC™-2000SP proves that beauty can be more than skin deep.

Because it was also designed to deliver high-speed blacks, superb photographic printing, superior operating economy and even offers optional scan/copy/fax functions – all for an incredibly low price. And that's just for starters!

Introducing Automatic Image Improvement. Canon has developed a way to automatically improve less than perfect digital images, without needing colour balancing and re-touching. It's called Photo Optimiser. This new, selectable driver function automatically adjusts for defects in exposure, highlights and shadows, without affecting the original file in the computer.



Optional IS-22 scan head fits into print head slot.

Brilliant colour. To further improve images, Drop Modulation Technology™ with dual drop sizes for smoother colour gradations works on all paper types. Then, for the gold standard in photographic reproduction, Canon's PhotoRealism inks[1] vary the saturation per pixel so that a single dot could have 0%, 33%, 67% or 100% of a colour. This produces up to five times as many colour combinations as conventional CMYK inks, with better half-tones and almost no visible grain, even in areas of low colour density.

Better operating economy. Super Economy mode reduces ink consumption by up to 75%, and works in both black and white and colour. It can print up to 3600 pages in black text, and up to 400 in colour.[2] And because the standard inks are optimised for low-cost plain paper, you can keep the cost of your everyday printing needs to a minimum.

It's even a scanner. The optional IS-22 scan head allows you to turn your printer into a colour scanner in seconds. It scans colour images up to 360 dpi and documents for fax, OCR and copying functions with the appropriate software.

Canon Customer Care. Canon Australia supports the BJC-2000SP with a one-year warranty, upgradeable to three years for minimal cost, and is backed by Customer Care hot-line support. For more information call us on 1 800 021 167.

PhotoRealism™

New BJC-2000SP colour Bubble Jet™ printer – $199[RRP]

Canon

Price shown is recommended retail price including tax. Canon and the Canon logo are registered trademarks, and BJC, Drop Modulation Technology and PhotoRealism are trademarks of Canon Inc. All other trademarks are the property of their respective owners. 1. BC-20 Black and BC-22E PhotoRealism ink cartridges are optional. 2. B&W output for BC-20 ink cartridge at 5% coverage and colour output for BC-21e measured at 7.5% coverage. Canon Australia Pty Ltd ACN 005 002 951. CS/8411

Forum

We welcome comments and suggestions. Send correspondence to *APC* Readers' Say, PO Box 37, Sydney 1028, or email APC@acp.com.au.
All correspondence becomes the property of *APC* and is subject to editing.

Viruses and privacy

Simon Vandore's article on viruses (see *APC* December 1999, page 79) was enjoyable and interesting. It was also good that you dispelled some of the myths about how computer viruses are spread. However, I think you are too optimistic about viruses [except BIOS killers] not being able to kill hardware. One area of possible attack is monitors, particularly older VGA/SVGA non-multisync types. As a Linux enthusiast, I am aware of the dangers of overdriving these monitors at scan frequencies above their design specifications. In extreme cases this can cause overheating and physical destruction of the monitor. It would seem easy to write a virus to cause this type of damage; it would probably succeed if the computer user was unaware of it and did not immediately switch off their machine.

A virus could also manipulate the clock frequency of the CPU/motherboard, or alter [increase] the amount of power supplied to the CPU and other chips. The latest motherboards tend to be jumperless, which is good from the user's point of view when assembling or upgrading their computer. The easiest and most foolproof way of preventing some of these problems is for motherboard manufacturers to return to using jumper pins in vulnerable parts of the system. Any computer part that can have its frequency, voltage or current settings changed under software control [even CMOS/BIOS] settings, is theoretically open to attack. Older computers, such as 486es, are less vulnerable, as their BIOS is stored in ROM.

On another subject, I am aware of various large organisations (government and business) who are trying to get their staff to sign statements about their Internet use. While I agree that sexual harassment, hate mail, porn and viruses are serious issues, some of these 'agreements' also give the right for employers to sack their staff for a few private (and innocent) emails, without due legal process. The agreements are, in effect, a form of advance confession or entrapment for the 'guilty'. Although I think some of these creeps deserve a long jail term, I would prefer that these organisations did not take the law into their own hands.

Certainly these organisations have a right to say how their networks are used, but there seems to be little thought given to safeguarding the employees' civil rights and privacy.

Bob Hunter
Internet

Big Pond in the bush

In your ISP reviews, Telstra Big Pond consistently rates among the best ISPs in terms of service and performance. Yet you have, to my knowledge, never mentioned its Rural Access plan. This plan, although expensive, provides local call cost Internet access to many communities with no local POP. I used this as my primary ISP until recently, when a much cheaper (and much less reliable) ISP established a POP within local call range.

In over four years (and hundreds, probably thousands, of sessions), I have only once had an engaged signal and I got through immediately on the next try. I don't remember ever having a call dropped either. I live on a rural property over 5km 'as the crow flies' from the Telstra substation which serves me. With Rural Access, I consistently get 28.8Kbps connections and occasionally 33.6Kbps (it's just too far to expect better, even with a V.90 modem).

According to Telstra, the concept of Points of Presence doesn't really apply to this service. Telstra routes any call to the nearest *available* modem. It's an 0198 phone number, but is charged at local call rates. For anyone who doesn't have a local call POP, I highly recommend this plan. The cost is $14 per month which includes up to two hours, and additional time is charged at $7 per hour (incremented by hundredths of a minute). It is expensive but better than paying STD and the service is excellent. It wouldn't be a good deal for anyone who can restrict their Internet access to 7pm to midnight when the maximum STD charge is $3, but for anyone who needs reliable Internet access during the day and has no ISP with a local POP, this plan is excellent.

James Wolz
Kumbia, Qld

THREADS from *APC*'s Web sites

Ask and ye shall receive. **Newswire**'s Angus Kidman proved that when he noted in his online DisGust column that he'd thought of installing Linux on his notebook, but was scared off by the open source OS' difficult reputation with portables. Angus asked if he should make the move regardless. Based on Sounding Board responses, the answer is a resounding (deafening) 'yes':

Make the jump — you'll be amazed how much you learn and how much fun you have doing it. Completely control your computing environment for a change!

Others pointed out that it wasn't an all or nothing move:

You don't have to go cold turkey on Windows. Look up your local Linux User Group, turn up to an installfest, let experienced installers help you with your first time installation of Linux. If you have the disk space, you can dual boot Linux/Windows.

Most acknowledged that notebooks and Linux could be a messy mix:

Notebooks can be a sore point for Linux advocates. Software modems aren't the half of it, although I've always used an external modem anyway. It was the lack of availability of a proper XFree86 server for the Neomagic video chipset that ticked me off — I've since learned to research things a bit better before committing to hardware. Even with a crippled display, my notebook's never booted Win95 from a month after I bought it.

Angus is still making up his mind, but is definitely leaning Linux-wards.

Want to put across your view, or see what other readers have to say? Join the discussion at http://apcmag.com/interactive/ and http://newswire.com.au/sboard/.



Canon BJC-80
$399RRP

PORTABLE
ESS · STOP PRESS · STOP PRESS · STO

Canon BJC-50
$699RRP



Advanced colour, cable-less communications, optional scanner plus two sizes that are

Small and smaller!

Canon has a wonderfully new idea for people that need a portable printer. A choice.

On the small side there is the BJC™-80. It is a fraction of the size of a briefcase. Yet, with its in-built sheet feeder and power adaptor included as standard, it is designed for people who have to produce high volume output from a very small printer.

Drop Modulation Technology.

Conversely, if size is critical, there is the brand new BJC-50 with in-built battery. It's not just small, at approximately half the size of the BJC-80 it's absolutely tiny.

Equally impressive, their performance is as big as their size is small.

Using Canon's advanced Drop Modulation Technology™ you can print everything from colour charts, to high quality photographs. Or, in seconds you can convert to extra high-speed black and white for finished business documents using the dedicated black cartridge with 128 print nozzles!



The BJC-80 fits in approximately half the space of a briefcase. The BJ-50 is approaching 50% smaller still.

Optional colour scanner.

For greater portability, both models include an infra-red port for totally cable-less communications with any suitably equipped Windows® 95/98 notebook or PC.

And, if you really need the functionality of an office in the space of a briefcase, both models will accept an optional colour scanner head in place of the print head. It takes only seconds to change the heads. You can then use the scanner head to acquire colour images, or for fax and OCR functions.*

Cable-less communication.

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support. Drivers are available for DOS, Windows 3.1x/95/98 and Windows NT.

If you need help choosing between small, and smaller, give us a call on 1 800 021 167.

Canon portable colour Bubble Jet™ printers

Canon

Prices shown are recommended retail prices including tax. *Scanner-head works with Windows 95/98 only. Fax and OCR software not included with purchase. Canon and the Canon logo are registered trademarks and Drop Modulation Technology, Bubble Jet and BJC are trademarks of Canon Inc. Windows is a trademark of Microsoft Corp. in the U.S. and other countries. Canon Australia Pty Ltd ACN 005 002 951.

CS6019



We have come to the end of the line with word processing and spreadsheet software.

By Jeremy Horey

I want it all

The personal computer boom of the 1980s and 1990s was driven by personal productivity software. It put real computing power into the hands of individuals for the first time, and software changed the way people did their jobs. Suddenly an accountant could produce sophisticated models of how the company's profits would be affected by different capital investments. Suddenly people could write documents that looked good and could be easily kept up to date.

These changes have transformed the way business works. The quality of reports, analysis, projections, and other business management tools is much higher than it was in the era before personal productivity software. These changes will stay, but the era of personal productivity software is over.

The emphasis is shifting away from tools that manipulate bits towards tools that communicate bits. The 'personal' is going out of productivity software. If you take note of what Microsoft does, you may have noticed a pattern in its investments over the last two years. Microsoft has invested in communications and telecommunications companies. There is a reason for this. Most new developments, most of the interest and most of the growth in computing in the next few years is going to be in the interaction between computers and communications.

The Internet has shown us what is possible when the networks that link computers get linked together, and it is changing business and the media. That interaction is just the start. The extension of communications to other electrical devices will also have a profound affect on the world. But the revolution is still some years away. A lot of changes in the way that TVs, videos and other appliances are made needs to take place first.

The change in software is starting now. It is all about adding the ability to communicate and share to software. It is about building productivity software that interacts with as broad a set of outside sources as possible.

There is no doubt that Lotus Notes was a revolutionary product. Notes delivered information sharing and then communication features in productivity software form long before other companies had thought about this at all. In fact Lotus was a real pioneer. Agenda was another tool for sharing information that was way ahead of its time. It suffered from a terrible user interface and overly complex feature configuration, but Lotus gave up on Agenda too easily.

The trouble with Notes was that it was a closed system. It did not dynamically interact with outside data sources. That is being fixed and the latest version has some very nice interactive features.

Notes needs to become a framework in which any software can operate. Lotus has an opportunity to open up Notes so that other programs can take advantage of its communication and information-sharing features without requiring a complex configuration process. Of course this would require other software vendors to take advantage of those hooks as well.

Whatever happens with Notes/Domino, the next versions of productivity software from all vendors are going to have new communication and information-sharing features rather than new features for manipulating data. We have already seen this trend with the latest releases, but what we have seen so far is mostly poorly thought out and too proprietary. New versions will make this stuff look like beginners mode.

The tricky bit is that there are two sides to this. Software needs to have the ability to communicate and share, but data sources need to become more open as well. We have the technology — XML — but we lack the standards in most areas.

I want my new spreadsheet to be able to read XML and to communicate with Web sites to build complex combinations of data and events. I also want my spreadsheet to be able to access my bank account and credit card records and extract everything that looks like it might be a work-related expense.

> Software needs to have the ability to communicate and share. We have the technology: XML.

I want my word processor to be able to read XML from any source and cross-reference it with other documents. I want the integration between the word processor and my communications tools to be seamless. I want to read the latest documentation on the projects I am working on and then see if the author is online so that I can clarify a point.

I want much more sophisticated tools for my email program. I want messages about meetings to be streamed into my calendar, and messages about projects moved to the relevant places in the documentation.

I want more productivity from my software because it recognises that I am a member of a team, not just a person typing words or fiddling with numbers.

Jeremy Horey is a senior consultant with Com Tech Online. You can reach him at jhorey@comtech.com.au.



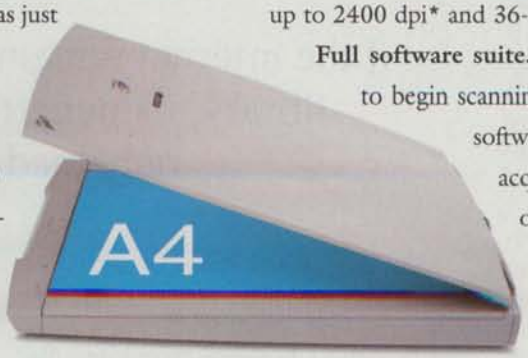
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So the Internet is now a place to create a community? And what's the news?
By Helen Dancer

The cyber-collective experience

Have you noticed how many people are starting to talk about the Internet as a place to empower the creation of communities? The word 'community' could become the buzzword of 2000: heard everywhere, said by everyone, understood by no-one and meaning different things to different people.

It's being written into the rhetoric of new media companies, especially those that describe themselves as portals to an online shopping mall.

MIT Media Labs' Dr Andrew Lippman addressed this at a lifestyle summit held by Samsung late last year in Singapore. It takes a village to make a mall, he told the assembled crowd, and although it has taken some time to build up, we now have the village. Ecommerce will turn the village into a mall. There's a great deal of truth in Lippman's comments.

Cambridge Technology Partners managing director Peer Nielsen echoes the sentiment of Metcalfe's Law when he says that the power of the telephone lies not in that there is one of them but in that there are many. The usefulness of the network, says Metcalfe, increases exponentially with the number of people connecting to it. However, Nielsen points out that although the usefulness of the telephone depends on vast replication, it is still basically limited to hosting conversations one to one. The network is a far better medium for hosting one-to-many interactions.

Lippman believes the important point is that the Internet has become a dominant infrastructure, the mechanism by which people will 'connect'. When the medium, whatever it is, becomes pervasive, then all technology gravitates to it. He draws a parallel between cyberspace and the coming of the highways. Whatever business you're in when the highway becomes the dominant infrastructure, he says that all of a sudden it's necessary, for your survival, to be on the highway.

When personal computers first emerged in the early 1980s, one of the groundbreaking mindshifts came with the introduction of Visicalc. For the first time, computers could actually be used to do something constructive: running 'what if' scenarios to simulate the outcomes of various permutations of business decisions. But there were very few people who wanted to do that. Pervasiveness was still a long way off.

> If the Internet remained just a vast digital library, its penetration would have remained very low.

Tim Berners-Lee (original author of HTML and the HTTP) first conceived the Web as a vast digital library, as a place for academics to share, record and discuss their work. But if the Internet had remained nothing more than a vast digital library, its penetration would have remained very low — probably 5% to 6%.

What causes the Internet to take a turn and have an impact, says Lippman, is the notion of empowering the creation of communities. He tells the story of Howard Rheingold, an early Internet evangelist, going to the Internet instead of the telephone when his new born baby took suddenly ill. While his wife tried to dial a doctor, Rheingold went out on the Net, and found a practitioner, who gave him advice. The doctor's name, says Lippman, was 'Flash Gordon', obviously a pseudonym. The sense of community is so strong that Rheingold would trust the health of his baby to a man he had never laid eyes on, and who went under the name of a 1930s comic book hero, and take advice over the Web from him, rather than getting a flesh-and-blood doctor to attend.

Another early example of community was the MIT Media Labs electronic postcards project. *APC* wrote about this site many moons ago. It allowed you to create an electronic postcard, choose a picture and attach a greeting, and virtually 'post' it. Once the postcard was read, the recipient could choose to send one in reply, or send one to someone else. Within a couple of months, according to Lippman, the site was sending 30,000 postcards, a clear indication of a yearning for community.

Vic Sussman, from washingtonpost.com, sees the creation of communities from a consumer angle. He says that communities might be drawn and disbanded from a common but transient interest, such as making a purchase. People who might have nothing in common other than the desire to buy a PC, a car, or household furniture, might well use the Internet to come together in a collective of self-interest to present potential vendors with a compelling opportunity, gaining a good deal for themselves in the process. In this way, he sees the Internet as a sea of communities and the participants like sand drawing together and drifting apart as needs arise and are met.

Helen Dancer is the editor of the *Bulletin*'s e-bulletin section. You can contact her at hdancer@acp.com.au.

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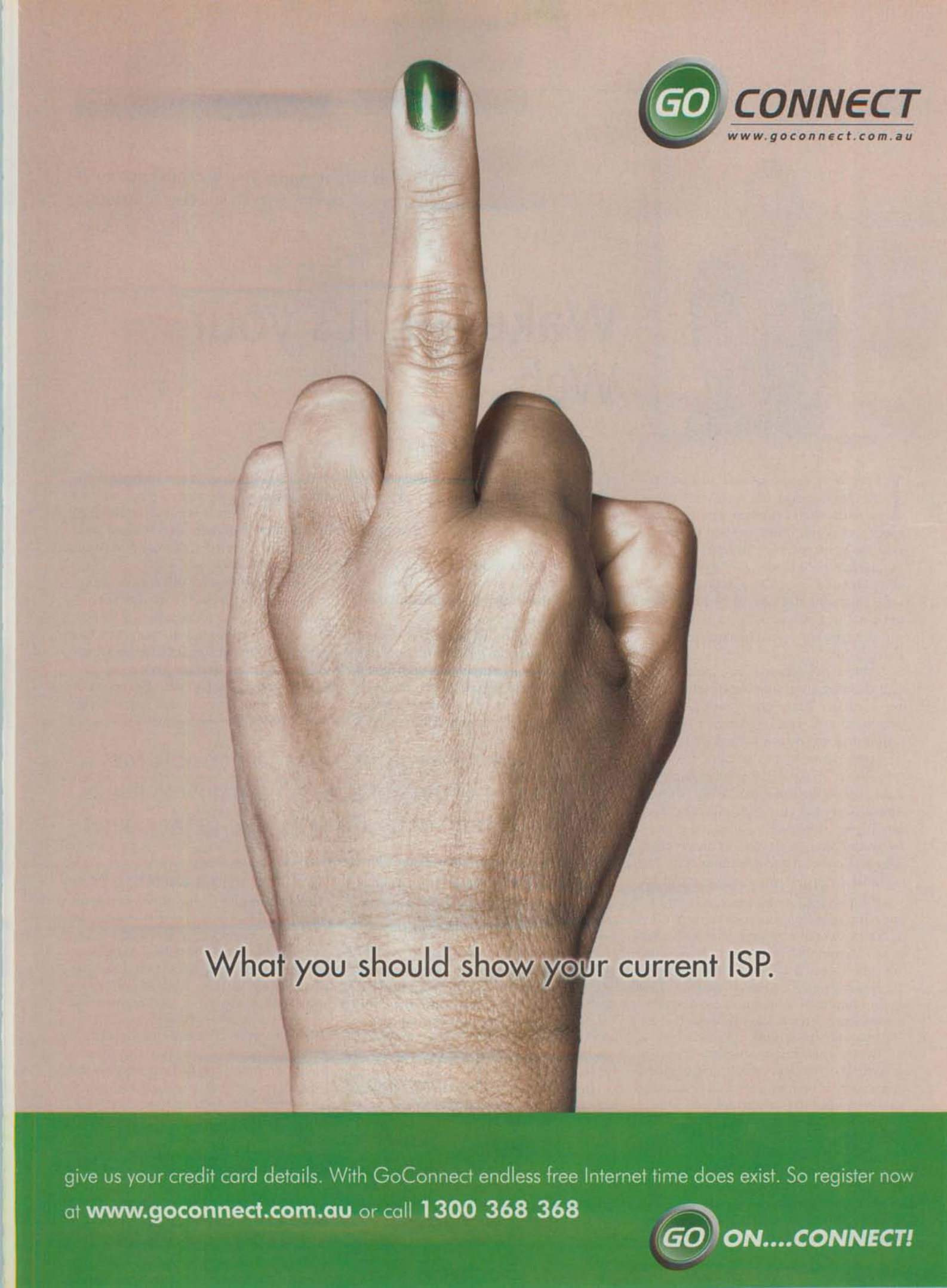
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The Web now puts you, the consumer, firmly in charge. But can you keep it that way?

By Geoff Ebbs

Wake up, it's your Web

If you have used a reverse auction site like BuyingEdge.com, you will appreciate the Web's consumer power. You specify what you want, and vendors compete for your business. Reverse auctions use the Internet's ability to connect to any computer and to combine information in ways that were not possible before. They are a natural extension of price comparison services like dealpilot.com or pricehunter.com.

Services like ichoose.com, rusure.com and clickthebutton.com are another logical extension. These software robots watch you shop and aim to improve on any online deal you attempt to enter into.

These 'power to the customer' tools are only one of a handful of services that currently favour the consumer. As well as free email accounts like hotmail.com and kmail.com.au, there are sweepstakes, giveaways and 'earn while you surf' services like Alladvantage.com and eliberation.com.

Most Internet companies trying to establish an online presence are not making a profit, but are currently buying market share of online viewers. Obviously this is not sustainable in the long term, and consumers need to make sure that the ones that remain have our interests at heart. The reason that these companies are forced to sacrifice profit for market share is tied to the fundamental nature of the Internet.

The Internet changes the way business is done for a number of reasons. First, every computer can be connected to any vendor, and every vendor is only a single URL away.

Second, there is no centre or hub for the network; it is totally distributed. No-one can predict the path a particular packet of information will take or where different elements of the Web page will come from.

Historically, the Internet is based on services that take advantage of the network's distributed nature to reduce the cost of delivery and overhead on the network. Newsgroups, mailing lists, and IRC networks all require the cooperation of ISPs and network providers to make them work. In 1995, you could use almost any ISP's SMTP server to send mail, any news server to read news messages and you could get a list of their users through tools like Who Is and Finger.

For security reasons, these services are now closed, except to people with accounts on those systems. Controls have been added to the network to protect the commercial interests of the service provider. Firewalls that filter traffic according to business rules were developed as an afterthought to apply commercial rules to a decidedly non-commercial network.

Last December, a gathering of ISPs and telecommunication companies met in Sydney to discuss 'peering', ways to manage and account for traffic sharing over the network. Disputes over peering have led to major splits in the Internet when subscribers could not 'see' large chunks of the Net because traffic had been screened for commercial reasons.

The danger is that the major retailers and information providers will devise ways of controlling the flow of information so that the services which favour the consumer too greatly are limited as well.

The commercial organisations that now have responsibility for running the Internet have to figure out how to live in a world where there is no natural advantage to the owner.

The short history of the Web has been a battle between its original ethos of cooperation and open sharing of knowledge, and vested commercial interests that would like to protect their cosy and dominant positions.

A lot of the free services being offered are in fact attempts at ersatz control of the network by building a monopoly over particular forms of information. Microsoft has purchased Link Exchange and Submit It has integrated Firefly into its profiling system, and has almost wiped out Netscape, CU-SeeMe and numerous other competitors by giving away these services for free.

> Commercial organisations responsible for running the Internet have to learn how to live in a world with no natural advantage to the owner.

All these services consolidate information centrally in an attempt to limit choice. If all sites and all customers use a set of profiles, controlled by Microsoft or anyone else, no-one will be able to do business effectively without adopting that system. By participating in these services, consumers empower the owners in the way that the Internet disempowered them.

What can you do? You can support the legal attempts to prevent the monopolisation of the Internet and oppose the Australian and Singaporean governments in their misguided attempts to control content. Most importantly, continue to experiment, and adopt and enthuse over participatory projects. After all, it's our Web, let's keep it that way.

Geoff Ebbs is an author and portal designer at Wide West Media. He can be reached at geoffe@widewest.com.au.

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Falling laser printer prices are making them a viable option for home use and small offices.

The price is right

Laser printers used to be an office-only solution because both the printers and consumables were far too expensive for most homes. However, laser printer prices have come down, making them much more affordable for the home user.

There are two reasons a laser printer is worth the extra expense: speed and quality. Inkjet printers might achieve near laser quality print, but compared to inkjets, laser printers provide cleaner type, much better graphics and no smudges. Home laser printers can print eight, 10 or even 12 pages of text a minute.

A reasonable quality laser printer shouldn't set you back more than $600 — at this price point you've got a choice of Brother, Canon, Fuji Xerox, Kyocera and Samsung. Hewlett-Packard's LaserJet 1100 costs close to the $800 mark, but there is nothing extra in terms of specifications or capabilities to recommend it. The same can be said for Epson's EPL 5700, which is even more expensive. Also, 600dpi is sufficient for almost all home use and almost all the printers vendors suggested were 600dpi.

Although *APC* told each vendor we wanted a small, low-volume printer for a home office, Harris Technology suggested a 1,200dpi Hewlett-Packard LaserJet 2100 for $1,345, which is more suitable for a large office. The sales staff at Adelong and Office National were most helpful at working out our requirements and then suggesting a printer to suit them, while most of the other vendors just asked our price range.

The printer's speed is an at-best estimate, based on the printer's speed at plain text. Printing graphics can take longer, but often it's transferring the data between the computer and the printer that is the bottleneck. If you're going to be printing a lot of graphics, a USB or Ethernet interface will be faster than a parallel port connection.

There was a little variation in printer prices, but the replacement cartridges were another story. The same is not true for the replacement cartridges; manufacturers make a lot more money from the consumables. Replacement cartridges for the Canon LBP 500 ranged from $99 to $139, and Hewlett-Packard LaserJet cartridges ranged from $99 to $119. Most of the vendors we spoke to were a little sketchy when it came to details about replacement cartridges. Some didn't stock them, some didn't have prices available, and only a few had estimates of the cartridges' life.

Some printer manufacturers give cartridge life figures, usually in thousands of pages. These figures are estimates at best, since the amount of toner used depends on what you're printing; less is needed for text, more for graphics. It's important to consider the cost of replacement toner cartridges when purchasing a printer; even if the printer is cheaper in the short term, replacement cartridges can cost anything up to $200 each.

About Price Watch

Each month, Price Watch examines variations in retail pricing and service. Investigations are conducted anonymously, either by telephone contact with retailers or through pricing details supplied on their Web sites. Prices and specifications provided here are as quoted by retailers; while we assume these are correct, we cannot accept responsibility for errors or omissions. The responsibility rests with sales staff to provide adequate information, as their employer would expect them to do with every customer. Readers are advised to always obtain a written quotation prior to making any major technology purchase.

For a complete archive of *APC* Price Watch columns, see http://apcmag.com/pricewatch/.

Consumer laser printers

Retailer	Contact	Product	Resolution (dots per inch)	Speed (pages per min)	Price	Consumable cost	Consumable lifetime
Adelong	(02) 8344 3190 http://www.adelong.com.au/	Canon LBP 800 Samsung ML5000A	600dpi 600dpi	8ppm 8ppm	$575 $599	Didn't know $199	Didn't know 5,000 pages
Computer Market On Line	(02) 9439 0033 http://www.computermarket.com.au/	Fuji Xerox DocuPrint P8ex	600dpi	8ppm	$520	Didn't know	Didn't know
Harris Technology	1300 139 999 http://www.ht.com.au/	Hewlett-Packard LaserJet 2100 Hewlett-Packard LaserJet 1100	1,200dpi 600dpi	10ppm 8ppm	$1,345 $789	$170 $99	Didn't know Didn't know
International Software Warehouse	1300 300 003 http://www.iswh.com.au/	Hewlett-Packard LaserJet 1100 Kyocera FS-680	600dpi 600dpi	8ppm 8ppm	$789 $585	$99 $93	Didn't know 3,000 pages
Office National	13 22 78	Brother HL-1240 Canon LBP 800	600dpi 600dpi	12ppm 8ppm	$599 $599	$89 $99	3,000 pages 3,000 pages
Officeworks	13 15 05 http://www.officeworks.com.au/	Brother HL-1240 Canon LBP 800 Hewlett-Packard LaserJet 1100	600dpi 600dpi 600dpi	12ppm 8ppm 8ppm	$634 $619 $838	$129 $139 $119	Didn't know 2,500 pages 2,500 pages
theshop.com.au	http://www.theshop.com.au/	Epson EPL-5700 Hewlett-Packard LaserJet 1100	600dpi 600dpi	8ppm 8ppm	$825.26 $762.29	Didn't know Didn't know	Didn't know Didn't know

Not even an ISP with lots of money and good intentions is guaranteed to get it right from the outset. **By Roulla Yiacoumi**

Optus, 'yes'? No.

Australian Internet users have long had a choice of many Internet service providers. There may be some 800 providers, but many people complain to *APC* that there is not enough true competition.

When Optus launched its Optus Internet service last year, many expected the provider to offer competitive plans and services. Optus already owned Microplex (which it is now merging with the Optus brand) and so already had some experience in the ISP arena.

However, late last year Optus suffered a humiliating security breach after a page on its Web site — listing the logins and passwords of 115,000 Optus, Microplex and Dingo Blue customers — became publicly accessible. Optus very quickly took legal action against the seven people who saw the page before it was removed.

In *APC*'s annual ISP Service & Reliability survey (see *APC November 1999, page 80*), readers gave Optus Internet the thumbs down. Service & Reliability received the following letter from a reader:

Dear *APC*,
I was interested to see the story 'Optus triples Internet subscribers' on *Newswire*. Nice to see the way Optus' PR department prioritises things.

In Darwin, Optus' Internet access is basically broken. This is bad enough, but the fact that Optus doesn't seem to care about it or prefers to blame it on the customer is much worse.

Some months ago, it was impossible to dial in to Optus thanks to constant busy signals. People complained in droves, and eventually one of the support staff admitted that the Darwin POP was averaging 98% capacity. I would be lucky to get on once a week. They fixed this by adding more modems, but things got worse.

It became almost impossible to download anything — 100% of transfers were failing. This went on for months, and support staff told some customers it was their fault and they didn't know what they were doing. I managed to convince them to dial into the POP, and then they changed tactics and decided to write a template and send it out to people who complained. The template was basically 'insert name here — we're in the process of upgrading our POPs, sorry for the inconvenience.' Tough. And the smart-arse comment at the end of the email wasn't too impressive; it basically said your contract states that we're allowed to interrupt service while we upgrade so stop whining. I don't care how incompetent Optus is, but it doesn't take this long to upgrade a POP.

Things are much better now but I still spend over $100 a month in calls to Optus. The system disconnects on a random basis. I get disconnected at least 10 times a day. Often I dial back and the system will 'not respond to a network request'. This has been experienced by everyone I know who uses the Darwin POP. Again, Optus doesn't seem to care. Blame it on the customer, send out the same letter about upgrades. It's getting a bit old — we've seen nothing so far.

The service is slow and unreliable. I would be interested to know how many emails Optus has had about the Darwin POP, I would say they number in the hundreds. Optus' arrogance is unbelievable. It would seem its helpdesk training consists of 'if it doesn't work, tell the customer they need to change their init string'.
Adam Whitehead
Anula, NT

APC forwarded this letter to Optus and received the following response:

Dear APC,
Optus Internet has grown rapidly since our launch in March last year and we now have close to 100,000 customers. While growing is exciting for the company, the speed of the growth has unfortunately caused capacity problems like those outlined in your letter.

To increase capacity, we are currently upgrading and expanding our Optus Internet networks. The downside of the upgrades is that some of our customers are experiencing congestion at some points of presence (POPs) and Darwin is one of those problem areas.

Rest assured that Darwin is a high-focus site for us and that the issue has been escalated to senior management. We should have full service up and running by mid-October 1999. (The Darwin POP was upgraded in July 1999 and it reached capacity very quickly, so we are now undertaking a second upgrade.)

To your reader, we appreciate your patience with us during the upgrade and apologise for the inconvenience you've been caused. We are confident that you'll enjoy Optus Internet again when it is 'running on all cylinders'.

We also want you to know that Optus Internet Customer Service has ongoing initiatives in place to continue to build on the service we provide.

Please visit our Web site at http://www.optusnet.com.au/ for more specific information about the status of the Optus Internet services around the country.
Optus Internet Management

Adam wrote to Service & Reliability in December to say a number of Darwin users had complained to the TIO about the service provision. A complaint would also be lodged with the Australian Competition and Consumer Commission (ACCC), he added. "We've been getting the upgrade excuse for the past few months regarding myriad problems we've had," he said. "At one time, 100% of downloads were failing, another time it was necessary to keep redialing for as long as two hours to get a line."

Service & Reliability has also received a large number of complaints from users in Victoria about Optus Internet. "I have wasted 120 minutes in a week trying to get connected," wrote Malcolm Place of Bundoora. "I always seem to get busy signals after 6pm," Michael Harrison of Glen Waverley told us. "I have to dial in about 30 times to connect during peak times," said Shaun Bickley of Boronia. Finally, "Your review of Optus Internet was too kind," Spencer McPherson wrote. "I persevered with them for several months and gave up in disgust."

Have you ever tried one of Australia's larger ISPs, only to find the service wasn't up to scratch? Did you complain and if so, what was the outcome? Email me at ry@acp.com.au or write to Service & Reliability, *APC*, PO Box 4088, Sydney, NSW 1028. Letters may be edited for length or clarity. We regret all letters cannot be personally answered.

Confusion over the many flavours of Linux has prevented it from being a big hit on corporate desktops. **By David Braue**

Linux fracturing is a non-issue

Linux may finally be providing a viable alternative to Windows for corporate desktops, but its uptake in this market has been hindered because companies become intimidated by having to choose a strategic desktop environment from a field that seems to be getting larger by the week.

Proliferation in the Linux space may sound all too familiar to corporate IT managers who lived through the ultra-competitive environment which saw Unix code hijacked and released in no fewer than 17 different proprietary versions. Fundamental incompatibilities between those versions forced software vendors to develop multiple versions of their Unix applications for key platforms, which added to the complexity and cost of managing Unix environments.

As Linux's open source licence now allows anybody to enhance and distribute their own version of the operating system, many companies may be concerned that the commercial viability of Linux could be damaged by the abundance of Linux implementations. A handful of high-profile implementations — Red Hat, Caldera OpenLinux, SuSE, Debian and TurboLinux — get most attention from the media and vendors, but there are dozens of other Linux variants: consider Mandrake, Macmillans, LinuxPPC, Yellow Dog and Slackware.

The situation is eased somewhat by the fact that vendors enhancing open source Linux mostly make their modifications freely available to others. This discourages developers from excluding competitors by developing proprietary versions of their software, since any developer can borrow and implement the features created by others.

"In some ways, open source leads to a convergence rather than a divergence," says Gordon Hubbard, director of Custom Technology, a Linux and BeOS distributor. "If things start going in the wrong direction from the users' point of view, that direction falls away over time. The old Unix world started from a common point and diverged away from it, while Linux has tended to track pretty well along a straight line."

The ability to share code freely among developers has helped keep Linux developers working around just two basic code bases: Red Hat and Debian, which differ mainly in their application distribution formats. Instead of differentiating themselves on features as Unix vendors did, having two major code bases has let Linux vendors add improvements such as easier installation, optimisation of particular components, better driver variety, or target a distribution at a particular audience.

"To get where it is, Linux has become the chameleon of the operating system world: it can interoperate with TCP/IP, NetBIOS, AppleTalk, DecNET, and pretty much everything else," said Con Zymaris, managing director of Linux consultancy CyberSource. "The open source licence guarantees a level playing field and obviates the need for vendor customisation; differentiation comes much more in terms of the branding, support and [focusing on particular markets]."

Corel, for example, used Debian as the basis for a Linux that would be easy to install and use, and would provide a Windows-like look and feel to minimise the retraining time required for corporate users. Caldera OpenLinux has a graphical installation routine and the ability to install the system from Windows. Mandrake's Linux builds on Red Hat, but is said to run up to 30% faster because it has been compiled specifically for Pentium processors.

Since they all operate from the same basic kernel, businesses can mix and match various Linux implementations without having to worry about compatibility issues. This allows businesses to pick the best distribution for their desktop and server independently, a marked change from the traditional 'Windows 98 desktop and NT server' combination that is almost taken for granted today.

A number of available and developing products allow companies to use Linux as their basic desktop platform, and run Windows applications using a virtual Windows machine. The best-known package for doing this is VMware, which creates a BIOS-level copy of a Windows PC that runs most Windows applications. VMware can be expensive in large quantities, particularly when Linux itself is free. For this reason, companies may want to consider cheaper alternatives such as Win4Lin (http://www.trelos.com/) and the free Wine (http://www.winehq.com/), which both run Windows applications directly on the Linux desktop.

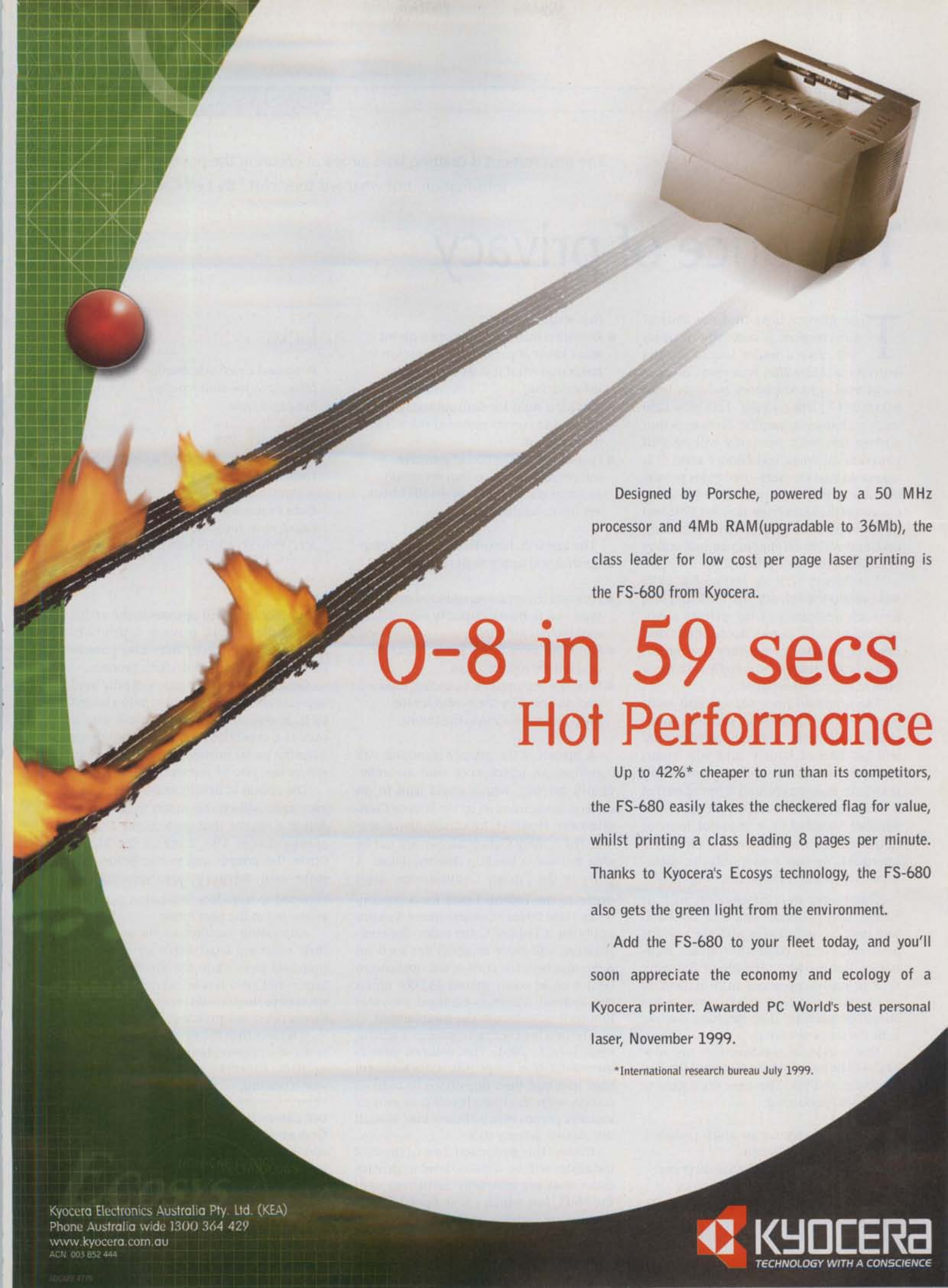


The momentum surrounding open source software has seen free alternatives to many of the technologies in the Windows world. Citrix MetaFrame allows businesses to deliver Windows applications to a Linux desktop, for example, and smaller businesses put off by MetaFrame's high price can obtain free applications that perform similar functions such as AT&T's Virtual Network Computing (http://www.uk.research.att.com/vnc/).

"Where Linux is really going to pick up in the corporate scene is in the thin client area," said Anthony Rumble, managing director of EverythingLinux. "The fact that you can get Citrix drivers for Linux [is a big help], but when you're trying to cut down the cost of a machine and you have to spend hundreds of dollars [per user] on the operating system, it's a real pain."

Now technological compatibility issues have been almost eliminated, the decision to go with Linux may well come down to other factors. Concerns that the free software won't be well supported have, for example, been fixed by service packages from trusted names such as IBM and Hewlett-Packard, and there are dozens of smaller businesses ready to provide support to those adopting Linux.

For a complete archive of *APC* Corporate colums, see http://apcmag.com/corporate/.



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TECHNOLOGY WITH A CONSCIENCE

The government is drafting laws aimed at ensuring the privacy of personal information, but what will they cost? **By Leif Gamertsfelder**

The price of privacy

The privacy laws that the Federal Government is currently drafting will have a major impact on the activities of Australian businesses because no general right to privacy has ever been recognised in this country. This may take some businesses by surprise. Businesses that address this issue promptly will be well placed to minimise compliance costs. It is estimated that the start-up costs for private industry in the UK in relation to the introduction of the Data Protection Act 1998 will be approximately £1.2 billion ($3 billion), and there will be an ongoing annual outlay of £635 million ($1.6 billion).

The Privacy (Private Sector) Bill 1999 will amend the Privacy Act 1988 and will force all businesses in the private sector (including clubs, banks, accountants and retailers, whether or not they are corporations or sole traders) to comply with these laws at their own expense.

The proposed laws will contain standards for the handling of personal information. The term 'personal information' will be defined widely and will mean "information or an opinion (including information or an opinion forming part of a database), whether true or not, and whether recorded in a material form or not, about an individual whose identity is apparent, or can reasonably be ascertained, from the information or opinion".

This means that information such as names and addresses must be collected and used in accordance with the privacy laws when they come into effect. Businesses that produce software or firmware that processes personal information or can capture personal information online should ensure that their products comply with the proposed laws.

The standards contained in the new laws will be based on the National Privacy Principles (NPPs). The new laws aim to achieve the following:

- Regulate the manner in which personal information is collected,
- Regulate the use and disclosure of personal information,
- Provide quality standards in relation to personal information,
- Require personal information to be kept in a secure manner,
- Require a business to be open about what kinds of personal information it holds and what it does with that information,
- Provide a right for data subjects to access and correct personal information, and
- Prohibit the collection of sensitive information, such as that revealing racial or ethnic origin or details about sex life or health.

The law will, however, contain exemptions that will apply to the following:

- Personal information collected and used in a domestic capacity (eg, making a family tree),
- Employee records (eg, letters, resumes and referee reports), and
- Personal information collected, used and disclosed by the media for the purposes of informing the public.

A breach of the privacy standards will constitute an interference with an individual's privacy, which could lead to an adverse determination by the Privacy Commissioner. However, for constitutional reasons the Privacy Commissioner will not be able to issue a binding determination. A party or the Privacy Commissioner must apply to the Federal Court for a binding order. If the Privacy Commissioner does not apply for a Federal Court order, the complainant will have to apply for such an order and bear the costs of the application (which could easily exceed $5,000) unless the Federal Attorney-General provides financial assistance to the complainant.

The new laws will not commence until at least July 1, 2001. The delayed date is intended to give the private sector sufficient time to adjust their operations in order to comply with the laws. It will also provide industry groups with sufficient time to draft alternative 'privacy codes'.

Under the proposed laws, specific industries will be able to develop privacy codes that are generally consistent with the NPPs, but which are designed to suit the unique features of their industries. If such a code is approved by the Privacy Commisioner, it will operate to the exclusion of the default privacy legislation. Industry privacy codes may also provide their own complaint handling process.

Generally a privacy code will only bind organisations that consent to being bound by it. However, where compliance with a code is a condition of membership of an industry body, membership of that body will be taken to be consent.

The option of developing a specific privacy code will enable many industries to design a regime that protects the privacy of their clients. Also, to ensure consistency across the private and public sectors, the state and territory governments are expected to introduce legislation modelled on the bill in the near future.

Australian businesses should assess their potential legal exposure under the proposed laws when the Privacy (Private Sector) Bill 1999 is released and determine what steps they should take to comply with this major development in Australian law.

It is clear that the new privacy laws will come at a price for both business and data subjects. However, perhaps it is a price worth paying.

Links

Proposed Laws: Information Paper
http://law.gov.au/infopaper/infopaper.html

Privacy Act 1988
http://www.austlii.edu.au/au/legis/cth/consol_act/pa1988108/

Data Protection Act 1998 (UK)
http://www.hmso.gov.uk/acts/acts1998/19980029.htm

Leif Gamertsfelder practises at Deacons Graham & James in Brisbane. He can be contacted at leif.gamertsfelder@dgj.com.au. This column is intended to provide general information only and is not a substitute for legal advice. For a complete archive of *APC* Legal Ease columns, see http://apcmag.com/legal/.

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The second best monitor in this magazine offers resolution up to 1600 pixels per line.

Here's the one with 1818.

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*Calls from mobiles will be charged.

Aorta 8592

On one level, every cathode ray tube (CRT) works the same, whether it is used in a TV, or a computer monitor. Electrons bombard thousands of tiny little dots (phosphors) to give you a picture.



Hitachi shadow mask has the smallest horizontal dot pitch

The basic technology is now over a century old. Which is why so many companies make monitors. But it does not follow that all monitors have to be the same.

Hitachi, as the world's largest CRT manufacturer, and one of the few companies to also make the entire monitor assembly, understands this better than anyone. And our high performance 21" monitor proves it.



The world's smallest horizontal dot pitch. To start with, Hitachi has developed the smallest horizontal dot pitch on the market. Does this make a difference? It sure does.

The Hitachi Shadow Mask system uses a 0.22mm dot with a 0.21mm mask for a significant edge over the other leading brands, let alone the clones.

Compare this to four leading brands and you will find two using a slot mask system with 25mm dot and mask, and two using an aperture grill with 22mm stripe and 24mm mask.

In simple terms, this means Hitachi can deliver higher resolution with up to 1818 pixels per line, and the others only 1600. As you might expect, most clones aren't even in the race.

A better picture tuned to the human eye. But the advantage of Hitachi technology isn't limited to resolution.

The phosphor itself has an increased chromaticity range to give you a broader colour gamut with maximum brightness, wider control of brightness and contrast and better colour purity. To enhance the picture even further, we bombard the phosphor with an Advanced Elliptical Aperture, Dynamic Focus electron gun, and support it with the Invar Shadow Mask.

All of this ensures that both the length and landing angle of the electrons at the edge of the monitor are in tune with electrons at the centre. It also prevents the outer edge of the electron beam from hitting the wrong phosphor, without distorting the mask itself.

Images are perfect, even at the edges.

They are also flicker-free with an extraordinarily high refresh rate.

Less energy, less space, more safety. Paradoxically, this increased performance doesn't need bulky monitors with high-energy consumption. In fact, all Hitachi monitors not only satisfy Energy Star requirements, they typically use up to 10% less energy, making them the most energy efficient models in their class.

We have even adapted Shadow Mask technology to short-length tubes, to give you a monitor with 15% less depth, without the sacrifice in picture quality normally associated with this technology.

And all models meet the most stringent international regulations for electromagnetic radiation and reduced screen flicker. Which means you not only get a picture more pleasing to the eye, you get one that's better for the eye too.

For Windows, Apple and Unix workstations. Finally, all monitors offer a 3-year guarantee, are Windows 95/98/NT compatible and offer adaptors for Apple, Sun and other workstations.

So, now that you know why Hitachi monitors are so much better, you only have to make one choice. Which one? Hitachi. Aim high, there are no limits. To learn more call us on 1800 789 799* or visit the Hitachi web-site at **www.hitachi.com.au**

AIM HIGH

HITACHI

PC Service & Reliability Survey 2000



Yes, it's that time of year again! Here's your chance to tell us all about your PC and your purchasing experience. Complete this two-page survey and return it to us by Friday March 3, 2000. You'll be in the running to win a fantastic prize!

Your computer

Complete this for the PC you access most often. This can be a home computer, work computer, or other.

1. Describe the computer you use most often:
1 ❑ Brand name computer
2 ❑ Clone computer
3 ❑ Brand name notebook
4 ❑ Clone notebook
5 ❑ I built the computer myself
6 ❑ I had the computer built from parts I specified
7 ❑ Other. Please state:

2. This machine is:
1 ❑ A home computer
2 ❑ A work computer
3 ❑ A home computer which is sometimes/regularly used for work
4 ❑ A university/school/library computer
5 ❑ Owned by a friend or relative
6 ❑ Other. Please state:

3. What is the brand of this machine?
1 ❑ _____
2 ❑ No brand name appears anywhere on the case

4. What kind of processor does this machine have?
1 ❑ Intel Pentium or Pentium MMX
2 ❑ Intel Pentium II
3 ❑ Intel Celeron
4 ❑ Intel Pentium III
5 ❑ Intel Pentium II Xeon or Pentium III Xeon
6 ❑ AMD K6-2
7 ❑ AMD K6-III
8 ❑ AMD Athlon
9 ❑ Cyrix
10 ❑ Power PC G3 or G4
11 ❑ Other. Please state:

12 ❑ Don't know

Support

5. Have you ever had to contact customer support?
1 ❑ Yes
2 ❑ No **(go to Q 8)**
3 ❑ Can't remember

6. Was product support for the goods provided by the retailer or manufacturer?
1 ❑ Retailer (place of purchase)
2 ❑ Manufacturer (maker of product)
3 ❑ Don't know

7. How would you describe the customer support you received?
1 ❑ Excellent
2 ❑ Very good
3 ❑ Satisfactory
4 ❑ Poor

8. Has the equipment ever been unusable?
1 ❑ Yes
2 ❑ No
3 ❑ Don't know

9. If the product was repaired, was this done by:
1 ❑ Manufacturer
2 ❑ Retailer
3 ❑ Technician
4 ❑ Myself
5 ❑ Someone I know
6 ❑ Other. Please state:

10. How would you describe the repairs?
1 ❑ Excellent
2 ❑ Very good
3 ❑ Adequate
4 ❑ Poor

11. How would you rate the equipment for overall reliability?
1 ❑ Excellent
2 ❑ Very reliable
3 ❑ Satisfactory
4 ❑ Poor

12. Would you buy equipment made by the same manufacturer again?
1 ❑ Yes
2 ❑ No
3 ❑ Not sure

13. Would you buy from the same retailer again?
1 ❑ Yes
2 ❑ No
3 ❑ Not sure
4 ❑ They are no longer in business

Shopping

14. How was this machine purchased (not including any recent upgrades or components)?
1 ❑ It was bought new from a retailer
2 ❑ It was bought new, built using chosen components
3 ❑ It was bought second-hand from a retailer
4 ❑ It was bought second-hand privately **(go to Q 18)**
5 ❑ I don't own the computer **(go to Q 18)**
6 ❑ Other. Please state:

7 ❑ Don't know

15. Where did you purchase the machine?
1 ❑ In a computer shop
2 ❑ In a department store
3 ❑ On the Web
4 ❑ From a catalogue
5 ❑ This question does not apply to me

16. Which retailer was your machine bought from?
1 ❑ _____
2 ❑ Different bits came from different retailers
3 ❑ Don't know
4 ❑ This question does not apply to me

17. Why did you choose this particular retailer?
1 ❑ I saw an advertisement
2 ❑ It was conveniently located
3 ❑ I wanted to buy from a major retailer
4 ❑ It was recommended by someone
5 ❑ It had the best price
6 ❑ I searched on the Net
7 ❑ I had previously bought goods there
8 ❑ Other. Please state:

18. When was the PC or the last upgrade component purchased?
1 ❑ Within the last three months
2 ❑ Within the last six months
3 ❑ Within the last year
4 ❑ Within the last two years
5 ❑ More than two years ago

19. Do you intend to buy another PC or component soon?
1 ❑ Yes, within the next few weeks
2 ❑ Yes, within the next six months
3 ❑ Yes, within the year
4 ❑ I have no plans to make such a purchase

Your printer

20. What is the brand of your printer?
1 ❑ _____
2 ❑ No brand name appears anywhere on the case
3 ❑ I don't own a printer **(go to Q 25)**

21. How did you buy your printer?
1 ❑ It came bundled with the PC
2 ❑ From the same retailer as the PC
3 ❑ From a different retailer
4 ❑ It was given to me
5 ❑ Privately or second-hand

22. Have you ever had to contact customer support for your printer?
1 ❑ Yes
2 ❑ No
3 ❑ Can't remember

23. How would you describe the customer support you received?
1 ❑ Excellent
2 ❑ Very good
3 ❑ Satisfactory
4 ❑ Poor

24. Would you buy a printer made by the same manufacturer again?
1 ❑ Yes
2 ❑ No
3 ❑ Not sure

Your modem

25. What is the brand of your modem?
1 ❑ _____
2 ❑ No brand name appears anywhere on the modem
3 ❑ I don't own a modem. **(go to Q 30)**

26. How did you buy your modem?
1 ❑ It came bundled with the PC
2 ❑ From the same retailer as the PC
3 ❑ From a different retailer
4 ❑ It was given to me
5 ❑ Privately or second-hand

27. Have you ever had to contact customer support for your modem?
1 ❑ Yes
2 ❑ No
3 ❑ Can't remember

28. How would you describe the customer support you received?
1 ❑ Excellent
2 ❑ Very good
3 ❑ Satisfactory
4 ❑ Poor

29. Would you buy a modem made by the same manufacturer again?
1 ❑ Yes
2 ❑ No
3 ❑ Not sure

Your removable storage

30. What is the brand of your removable storage device (excluding floppy disk drive)?
1 ❑ _____
2 ❑ No brand name appears anywhere on the device
3 ❑ I don't own a removable storage device **(go to Q 35)**

31. How did you buy your removable storage device?
1 ❑ It came bundled with the PC
2 ❑ From the same retailer as the PC
3 ❑ From a different retailer
4 ❑ It was given to me
5 ❑ Privately or second-hand

32. Have you ever had to contact customer support for your removable storage device?
1 ❑ Yes
2 ❑ No
3 ❑ Can't remember

33. How would you describe the customer support you received?
1 ❑ Excellent
2 ❑ Very good
3 ❑ Satisfactory
4 ❑ Poor

34. Would you buy a removable storage device made by the same manufacturer again?
1 ❑ Yes
2 ❑ No
3 ❑ Not sure

35. Did you complete *APC*'s PC Service & Reliability Survey last year?
1 ❑ Yes
2 ❑ No
3 ❑ Can't remember

The best entry will win:



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Return your form to us by:

- **Mail** *APC* Survey 2000, *APC*, GPO 4088, Sydney NSW 1028
- **Online** **http://apcmag.com/service/** and follow the link
- **Fax** (02) 9264 6320

If you have any other comments or would like to relate a story about your purchasing experience, please attach a separate sheet with your name, address and contact number clearly stated.

Entry details

To complete this survey and be in the running for one of the prizes, please fill in the following details and answer the question below.

Name _____ Address _____

Email _____ _____

Daytime phone number _____ State _____ Postcode _____

Question: What is the worst IT product you have ever bought and why?

One entry per household only. Multiple entries will be disqualified. The survey may only be completed by Australian residents. The question above must be answered to enter. Entries close midnight March 4, 2000. Winners' names will be published in the July 2000 issue of *Australian Personal Computer*. *APC* judges will select the best response as the winner of the KDS Visual Sensations VS-F14 LCD monitor and four runners up as the winners of a copy of Windows 2000 and a Logitech Cordless Wheel Mouse. The prizes are at the discretion of the supplying vendors and may be altered depending on availability. All surveys, including your comments, become the property of *APC* and are for *APC*'s exclusive use. Names are not sold or given to other parties. *APC* may publish any of the respondents' comments in the reporting of the results.

Good luck! Winners' names and survey results will be published in *APC* July 2000.

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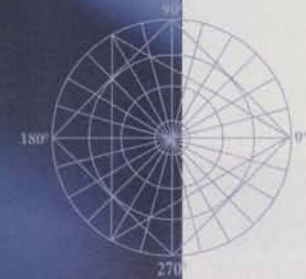
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GNU your rights

An interview with Richard Stallman

Richard Stallman is one of the fathers of Linux, founder of the GNU project and the Free Software Foundation, author of the EMACS text editor and one of the leading philosophers of the computer age. **Josh Mehlman** caught up with him recently in Cambridge, Boston's intellectual haven and home to Harvard and the Massachusetts Institute of Technology (MIT).

The first thing Richard Stallman said to me, after I found his office in a maze of corridors in one of MIT's many nondescript concrete buildings, was "Have you read the free software manifesto?" I said I had read it, but not recently. "Go and read it, and then talk to me," he said. "I say things a lot more eloquently there than I could tell you in person." Only after I had read the manifesto (http://www.gnu.org/) for about an hour would Stallman admit me into his office.

Stallman spends the majority of his time in two small, crowded rooms on the MIT campus in Cambridge, Massachusetts. As expected, his office is lined with books, but only a few of them are computer titles. His reading appears to be mostly war and travel books, with the occasional spy novel thrown in. After we completed the interview, he kept pulling CDs off the shelf and insisting that I hear them. He despises Western music, and listens to things like Bulgarian folk music with bizarre and complicated rhythms. Every time I tried to leave he would say, "But wait, how about this?"

Had it been anyone but Richard Stallman, most journalists would have walked straight out as soon as he insisted they read the manifesto. But Stallman is a pioneer and visionary, who now devotes his life to changing the software copyright and licensing systems he believes are crippling society.

Stallman founded GNU (a recursive acronym for 'GNU's Not Unix') in 1983, a year before Apple released the Macintosh, and when Windows was little more than a gleam in Bill Gates' eye. When Stallman started working at MIT's Artificial Intelligence Lab in 1971, the software developer community was exactly that — a community. Software was shared, distributed, modified and collaborated on freely. By 1984, the burgeoning business and home computer market meant big bucks for software vendors, and by that time almost all software was proprietary. Stallman set out to develop an operating system that was compatible with Unix, but completely free. 'Free software' doesn't necessarily mean free of charge. It means software that can be modified and distributed to other people, and that anyone who receives a copy is not restricted in the way they want to use it.

Although GNU developed many parts of a Unix-like operating system, it failed to develop a kernel. GNU's own attempt at a kernel, known as HURD (don't ask), has only recently become available. When Linus Torvalds developed his Linux kernel, many of the tools he packaged with it were GNU tools. Stallman worries that the success of Linux will write GNU out of the history of the free operating system. He estimates that in an average Linux distribution, about 28% of the source code is written by GNU, while only about 3% is the Linux kernel originally written by Linus Torvalds. Stallman refers to the kernel as 'Linux', but to the operating system as 'GNU/Linux', and encourages others to do so.

Stallman believes we are only just beginning to develop a philosophical and social understanding of computers. "Unfortunately, the companies that have a lot to gain from a particular outcome are being given too much voice in these decisions. They really should have only a minor voice,



because it's for the sake of the public that these decisions should be made." He feels the public is being left out because "we don't have very effective democracy nowadays. It's dominated by companies giving money to the politicians' campaigns and effectively buying the laws they want."

Copyright laws, he thinks, are of more benefit to the companies that distribute software than the authors of the software or the public. "The nominal purpose [of copyright] is to encourage progress that is supposed to benefit us all. But giving more power to the owners gets you to a point of diminishing returns where they use the additional power to enrich themselves, but it doesn't give us any additional progress. We have to realise that if copyright achieves its goal of bringing about a sufficient amount of progress, and if at the same time some people are getting benefit from the work without paying, that's not a problem for society, because the only issue for society is to get the progress. As long as authors are continuing to write, we don't have a problem."

> "... we also talk about the social benefits of having freedom, of being allowed to share with your neighbour, of being allowed to change things."

Stallman is not the only advocate of more freedom on the software block. The Open Source Initiative started in 1998, following Netscape's announcement that it was releasing the Navigator source code. However, the open source movement and the free software movement have been at odds from the outset. The open source FAQ (http://www.opensource.org/faq.html) calls open source "a pitch for 'free software' on solid pragmatic grounds rather than ideological tub-thumping".

Stallman feels the open source approach is too limited. "The open source movement focuses on particular practical benefits of a community in which users of software have certain freedoms, whereas free software is concerned not only with those practical benefits, but also with the benefit of having a society in which you're free to cooperate. In other words, psychosocial benefits as well as the practical benefits."

"These freedoms include the freedom to modify a program so that it does what you want, or fix bugs in it, or add features to it. This includes of course the freedom to hire a programmer to make the changes you want if you are not a programmer. It also includes the freedom to redistribute copies of the software, which is a way of helping your neighbour, a form of expression of goodwill within society. And it includes the freedom to make improvements that add new capabilities to the program and then publish the improved version so that the rest of your community can benefit from what you've done."

The ability to modify the program and to distribute your changes requires that the source code of the program be available. Stallman says the availability of source code has other benefits. "When a program catches on, lots of people start fixing the problems in it and improving it and this leads to powerful and reliable software." Stallman proudly mentions a study by Barton Miller at the University of Wisconsin that shows GNU utilities to be more reliable and less crash-prone than their commercial alternatives. "This practical benefit of high reliability and free software is what the open source movement focuses on. We agree with what they say, but we also talk about the social benefits of having freedom, of being allowed to share with your neighbour, of being allowed to change things."

These different approaches have contributed to a growing war of words between Stallman and various members of the open source movement. When Apple announced it was releasing parts of the source code of its OS X operating system, OSI co-founder Eric Raymond applauded the move, but others were not so impressed. Stallman objected because Apple reserved the right to withdraw parts of the code. "If somebody says 'I'll give you this freedom but I might take it back' he hasn't really given you the freedom." In addition, the Apple licence requires programmers to publish any changes they make, which does not respect their privacy, according to Stallman.

Selling's OK

Stallman is not against the idea of selling software; just because software is free of restrictions does not mean it has to be free of charge. "If a program doesn't allow you to sell copies, it's not free software because the freedom to exchange copies for some kind of benefit is one of the freedoms that our community needs in order to function." Software users might pay to have the software in a convenient format such as a CD, or for support, or for manuals. Stallman believes the free software model has the potential to improve customer support. "When you find a problem in a proprietary program, they let you report the problem, they may even make you pay for the privilege of reporting the problem, and then they say 'in six months you can buy an upgrade and maybe the problem will be fixed'. Whereas in the GNU project, when you report a bug to us, we thank you, because telling us where we've made a mistake is helping us get it right."

Stallman admits that free software is a lot more difficult for the inexperienced to use. "When we started the GNU project our goal was to make a system compatible with Unix, and that's what we have. So it's as powerful as Unix and it's as easy to use as Unix, which means it's not that easy to use." Stallman believes the Gnome project — which is developing a graphical user interface for GNU, and is included in the Red Hat Linux distribution — will help make free software easier to use. He also estimates that within two years there will be free alternatives to all the elements of Microsoft Office.

Stallman is very worried by the trend towards stricter copyright laws. "In the Soviet Union, every photocopying machine had a guard posted next to it to prevent unauthorised copying." The Soviet Government used four techniques to prevent illegal copying: prosecution, propaganda, police raids and collective responsibility by encouraging people to inform on their colleagues.

"In the US today, software companies and the government use the same techniques to try to prevent software being copied. The guards are automated, such as watermarks on pictures. There are harsh penalties even for giving a copy to your friend. There is collective responsibility, for example, making Internet service providers responsible for the content they host. And teachers are teaching kids to say 'yes' to licensing."

While the motives may be different — politics in the Soviet Union and profit in the US — Stallman says the methods always end up being the same. "If you want to stop people in general from making copies and passing them around to each other, nothing but a police state can do that, because it's such an intrusion into people's lives. The war on copying is going to spread a lot of misery in the next century, just like the war on drugs has been spreading a lot of misery in this one."■

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FEATURE

The tyranny of bandwidth

Experienced local Internet users have always envied the cheaper bandwidth available to many Americans. Although prices for cable Internet and ADSL continue to fall in the US, dialup is still the only option for most Australians. Does Australia's distance from the rest of the networked world mean it will always be left behind? **Simon Vandore** explains the politics of bandwidth in Australia.

Predictions in the early 1990s that the Internet would soon be replaced by a broadband 'superhighway' seem a bit silly now. More and more uses are being found for the global TCP/IP network, and some believe that it is slowly *becoming* the über-network once envisaged by governments and big business. Companies are learning that they must adapt to the online world, not try to shape it, while many consumers are now experimenting with bandwidth-hungry audio and video applications.

When an American visitor tells an Australian about listening to SHOUTcast transmissions or watching CNN online, they are often talking about something done at a connection speed higher than the theoretical 56K available to dialup surfers. Access the same audio or video feed from Australia and it may stutter and die within a few minutes. Using a lower speed and lower quality transmission is often the answer, but the combination of using an analog connection to *a digital network* and the latency and packet loss which can be experienced at peak times means a modem user simply can't keep up.

In the US, some centres now have flat-rate cable Internet available for $US40 a month. ADSL and ISDN are also viable options for many US consumers, as bandwidth charging is rarely used. Australians face a high cost of entry to equivalent technologies, as well as high tariffs on the amount of data sent and received.

Early growth

In the early 1990s, when Internet use began to grow dramatically, Australian users had a great deal in common with their US counterparts. Personal connection speeds (via 2,400bps, 9,600bps or 14.4Kbps modem) were similar, and only those in the CSIRO and universities had faster access. But the US already had a significant cable television infrastructure and experiments were soon underway to get TCP/IP working on these networks. ISDN (Integrated Services Digital Network) was far cheaper in the US, although slower at 56K per channel compared to Australia's 64Kbps.

The most publicly available means of access to an online environment was CompuServe Pacific. Anyone with a modem and a PC or Mac could access the network at a speed of 2,400bps or 9,600bps and eventually 14.4Kbps, but the costs for Australians were astronomical (24 cents a minute for standard services and 32 cents a minute for advanced services such as chat rooms and news reports).

Most of those who had access to the Internet were students or employees of universities or the CSIRO. Public dialup Internet services appeared slowly once the Net was opened up to commerce. OzEmail entered the scene as a national network offering email which just happened to extend across the Internet. It evolved into a TCP/IP network and early competitors included DIALix, which offered dialup access to a Unix shell account on a Net-connected computer for 1 cent a minute.

Gradually we moved to SLIP and PPP connections to the Internet, today's standard. The major bandwidth concern became highly graphical Web sites — many people kept images turned off in



their Web browsers because downloading a home page took too long. Modem bandwidth increased to 28.8Kbps, 33.6Kbps and eventually today's theoretical 56K. At the same time, the image compression expertise of site designers increased and graphical pages became less of an issue.

When Telstra took over the original AARNet Internet backbone in Australia, it introduced a pricing scheme for ISPs based on bandwidth consumption rather than simply the speed of the purchased link. This was against overseas trends and many ISPs voiced their anger, claiming it would adversely affect what they could offer customers, but to this day Telstra maintains a similar scheme, which has been mimicked by other local telecommunications companies.

Big Pond's introduction of cable Internet in 1997 was welcomed by power users. While it had teething problems, offered a limited range of TCP/IP services and in practice delivered much less bandwidth to each user than the company promised, it did offer a real alternative to ISDN for high-speed access at home. However, its high cost of entry and 35 cents a megabyte charge for transfers beyond the 100M covered by the $60 monthly fee (easy to use on a theoretical 10Mbps connection!) meant it was priced beyond the reach of average home users. Wiser customers figured out ways to create mirror sites on each other's computers and transfer files across the uncharged local network. Gamers used it to play against other cable customers without incurring external transfer fees.

Meanwhile, Cable & Wireless Optus has been testing its cable Internet technology since 1996 by offering free access to educational institutions. Several planned launch dates came and went, but last year Optus formed a joint venture with US cable company @Home, and will introduce a service early this year.

Obviously we have come quite a long way, but the gap between nations is growing. In Singapore (admittedly a small island with excellent communications infrastructure), it is possible to get an ADSL connection for a base fee of about $20 a month, and in the US flat fees for high bandwidth are just as common. In Australia, ADSL is still in testing and only one provider (Telstra) is scheduled to offer it, presumably at prices similar to, or higher than, its cable and satellite rates.

But it's not all bad news. There is now a disparity between the US and Australia, but there are some advantages in being slow on the uptake. Not all US cable providers are set up to provide Internet access, and there is a hotch-potch of incompatible standards in use. The same goes for various forms of DSL, where the US situation is similar to its mixture of mobile phone technologies. And contrary to popular belief, we should not be jealous of 'free' Internet access offers in the UK.

"You can have free access in the UK because it costs you so much for a local phone call [because they are time-charged and ISPs take a cut]," said Tom Worthington, visiting fellow at the Australian National University, who is currently working on his second Internet book. "In some ways, Australia is better off in terms of things you don't normally hear about. For example, in Australia, the local call

Great expectations

The future of Internet access in Australia may be just as tricky as the past and present. Four key technologies appear set to deliver much higher bandwidth data connections: cable modems, DSL, datacasting and satellite.

In December, Telstra outraged its Big Pond Advance customers by announcing changes to its pricing scheme. Telstra started charging for downloading mail and newsgroups and transferring files between Advance customers, which had previously been free of charge.

This was a case of bad timing for Telstra, as the announcement came only weeks before Optus announced its cable modem venture called Optus@Home (see 'Cable's on the table', page 17). Optus charges the same monthly fee as Telstra — $59.95 — but with one significant difference: Telstra charges extra for downloads after the first 100M, but Optus' plan is 'all you can eat'. Optus is likely to gain many disgruntled Big Pond Advance customers. It appears a price war between these two players is all but inevitable.

In addition, while Telstra exclusively uses the Motorola CyberSURFR Wave modem with its cable service, Optus' network can use any DOCSIS (Data Over Cable Service Interface Specifications, also known as CableLabs Certified) compatible modem. Although Optus plans to use only one brand of modem at launch, the availability of competing brands of modems and infrastructure should lower the entry costs to Optus@Home in the long term. Although Telstra and Optus' services are currently limited to major capital cities, cable modem looks to be the first affordable broadband service available to Australian Internet users.

Telstra announced a trial of an ADSL service in Melbourne in September last year, although the official launch is not expected until August. Because ADSL works best within 3.8km of the telephone exchange, it is best suited to CBD and heavily populated urban areas. Telstra officials commented about using ADSL in regional areas, but most industry observers believe the high costs and physical limitations of ADSL suggest Telstra is thinking about business customers in large rural centres rather than consumers in rural areas.

However, Ovum principal consultant Jim Holmes believes that because of their remoteness, rural customers are often quite heavy users of the Internet. "Since Telstra's already paying to provide them with 64Kbps ISDN access [under the universal service obligation], why wouldn't they try to sell more services to those customers," he said.

Since Telstra owns the copper local phone network, at the moment Telstra is the only telco capable of providing ADSL services. The ACCC's declaration of Telstra's local loop allows competitors to use it not only for local phone calls but also for DSL data. A spokesperson for IT minister Alston pointed out that the ACCC's declaration has already stimulated competition in the price of local phone calls, and claimed that in the long term, competition would bring down the price of ADSL as well. However, Holmes thinks that the unbundling of the local loop to allow competition for ADSL will not take place until at least August, and beyond that there will be technical difficulties that will further delay competition.

Killing your television

Following the government's recent announcement of its digital television policy (see 'Government cracks down on datacasters, page 22), it seems unlikely that datacasting will be a viable alternative

zone is larger so it's easier for an ISP to provide local access."

Promises, promises

The first Howard Government, elected in March 1996, came to power promising that all Australians would have access to ISDN connections. At the time, technology was part of the Liberals' science policy, which promised to make Telstra complete the digitisation of its exchanges by July 1, 1997 and accelerate the availability of ISDN to cover all digital exchanges — noting that only 3% of customers would fall outside this regime, but promising to find alternative means to get them connected. The Liberals also promised a price cap on digital connections.

"This will have the effect of ensuring that the cost of digital connection in Australia is competitive with overseas online markets," the policy states. "Our commitment to the widespread introduction of ISDN technology will provide the foundation for developing interactive services in Australia."

The trouble with this policy was that ISDN was already a 20-year-old technology and even higher bandwidth options would soon become available, along with cheaper means of providing them.

"Overall, the objective of higher speed connections was good — it was mentioning ISDN that was the bad idea," said Worthington.

Australian politicians have a poor record when it comes to Internet knowledge. US politicians, after a shaky start, have now thoroughly embraced the Net as part of their country's economic boom, while in the UK, the Blair Government recently launched an advertising campaign encouraging all Britons to educate themselves about computers and get connected.

However, only a few names roll off the tongue locally — former Victorian IT minister Alan Stockdale, the ALP's Kate Lundy, Democrat Senators Vicki Bourne and to an extent Natasha Stott Despoja. Policy appears to be determined by treating the Internet as a form of broadcasting, not as a two-way process without international borders.

At the 1998 election, the Liberals' Online Australia policy promised to "ensure that everyone has untimed local call access to the Internet", but did not mention bandwidth or any specific mode of connection. Instead, the Coalition has focused simply on bringing the Internet to the people and passing content regulation legislation. Although access at any speed is clearly the most important thing, it is difficult to look at the US and not feel left behind.

Labor's rather vague policy appeared under 'Building Communications Capacity' in the ALP platform: "Labor supports the right of all Australians to have equitable access to a modern comprehensive national and international telecommunications system, including broadband capacity. Labor believes that wherever possible, this access should be provided as a part of the universal service obligation, the costs of which should be borne by the industry."

Australia is currently the focus of

for high-bandwidth Internet access. As expected, the government has favoured existing commercial television broadcasters at the expense of aspiring datacasters such as news brokers Fairfax and News Ltd, as well as ISPs such as OzEmail.

Television stations must provide constant broadcasts in the standard definition (SDTV) format and 20 hours a week in high definition (HDTV) format. Theoretically, this should be a boon for datacasting, since SDTV takes up less of the spectrum, leaving more room for datacasting.

However, in order to keep the commercial stations happy, the government has restricted the content that is allowed to be datacast, so that datacasting does not compete with current television services. For example, while news stories may be datacast, they may not be linked to another item. This removes one of the main advantages of datacasting over conventional broadcasting, namely giving viewers the ability to go into greater depth for news items of interest or to skip over items that are not relevant.

Consumer satellite Internet connections have been available for over a year. Those willing to bear the upfront cost of a satellite dish and decoder box could download data at very fast rates, although uploads were still limited to modem speeds. More recently, Telstra expanded its Big Pond Advance service so that its customers without access to the Foxtel cable network can use a satellite connection to download data. The government amended the universal service obligation so that Telstra needed to provide a 50% hardware subsidy on a satellite connection to any customers who did not have access to ISDN.

A spokesperson for Stephen Smith, shadow minister for communications, said a satellite connection is insufficient and is not a replacement for ISDN. Although ISDN provides two-way bandwidth of 64Kbps and allows transmission of voice and data, the satellite provides one-way bandwidth of the Internet only, he said.

The government admits that aside from satellite, these broadband technologies will have a much greater impact in cities. Although costs are dropping across the board, Holmes said, they are dropping a lot faster for city users than rural users. "Rural users are becoming increasingly frustrated by the cost of their access to the Internet, and the Victorian election showed the power of rural disaffection," he said.

Because of the heavy demand in cities, the government believes competition will deliver the best outcome for consumers; a point on which the Opposition agrees. In rural areas, the government sees its job as spending money to provide the infrastructure that will allow competition to develop. 'Competition' includes encouraging rural communities to develop their own telecommunications infrastructure, which cities such as Ballarat, Ipswich and Orange have already done.

As previously reported (*APC* November 1999, page 133), Telstra plans to have a universal pricing scheme for its broadband access, whether the access technology is cable, ADSL or satellite. "As opposed to putting prices around a technology, we will be putting prices on applications," said David Stokes-McKeon, managing director of Telstra's convergent business next.

Everyone is prepared to comment on the direction of prices, but there is little information on how much less we are going to pay or how quickly prices will fall. "This will be the ultimate test of industry self-regulation if these benefits can be passed on to consumers within a reasonable time," said Holmes.

Josh Mehlman

some international embarrassment over the government's Internet censorship and bandwidth policies. At the beginning of the Internet boom, Australians were often mentioned as having one of the highest per capita Internet use ratios in the world and many US residents' first online encounters with people in other countries were with Australians. But words like 'backwater' and 'regressive' are starting to appear in overseas media comment relating to our censorship and privacy regimes — a recent article about Big Pond Advance prices on the US-based technology news site Slashdot (http://www.slashdot.org/) attracted a flood of comment from readers around the world, who expressed their concern after hearing negative stories about the Internet down under. In the space of a few days, Slashdot had reported on censorship, datacasting and telecommunications issues in this country.

"What is it with Australia and technology?" asked one correspondent. "What kind of sick mass-masochism do the people of Australia suffer from?" asked another.

Distance

As Australians, we face the problem of being very far from the rest of the world. We need a strong national network, but because the majority of Internet sites are in the US (which has 80%) and other countries, the speed and reliability of our overall Internet experience is directly related to the amount of available overseas bandwidth.

Satellite transmission is useful, but far slower than a physical connection, so the companies which bring us our overseas links prefer underground or undersea cable. Thanks to the speed of Internet take-up and the complexity of laying such cables, it was inevitable that we would spend some time catching up.

Australian Internet users often suffered a serious lack of bandwidth at the start of the Web boom from 1994 to 1996 — from time to time damage to the undersea US link limited capacity and backup satellite links didn't really suffice. For several months it was normal to see about 30% packet loss at peak times when connecting to the US via Telstra — this was about the time that audio and video streaming were invented, and at first they were almost useless to Australians. Eventually Telstra began upgrading its Internet capacity and other users started to benefit from the introduction of US links owned by Connect, Access One and Optus.

Telstra now has about 50,000km of fibre-optic cable forming its inter-capital grid around Australia, and thousands of kilometres connecting us to the US, New Zealand and South-East Asia. The current US link, named PacRim East, went live in 1994 and has half a gigabit of voice and data capacity. A 40G link to Singapore (and from there to several other countries) was completed in mid-1999. Telstra owns 32G of this link and also has a hand in an upcoming high-capacity cable between Australia and Japan.

Telecom New Zealand, Cable & Wire-

less Optus and MCI WorldCom are currently laying 2,150km of cable between Sydney and the US west coast, a link known as Southern Cross. It is scheduled to have 80G capacity between Sydney and Santa Cruz, with a further 40G between Sydney and Auckland, and should go live later this year.



Senator Richard Alston's term as Minister for Communications and the Arts has brought more access to the Net, but controversy over censorship legislation.

The Australian Internet user base increases by 1 million a year and the initial capacity of these links will fill surprisingly fast. Some have 'dark fibre' (unused capacity), while the bandwidth of others can be increased as networking technologies improve.

Distance within Australia is another problem. There are many places which will simply never be connected physically, where wireless methods will always be the only means of increasing bandwidth. At the moment, however, wireless transmissions only offer 14.4Kbps, or usually just 9,600bps, and users are holding their breath for the introduction of something better — at some point, most telephone calls from rural areas travel via wireless transmission, meaning users in the country often can't get connections higher than 9,600bps, even when using a 56K modem.

"For the general population we can't expect to keep up with bandwidth, simply because there are parts of Australia that are very sparsely populated," said Worthington. "If you took the comparable environment within Australia or the US or Europe, I think we could. But as a country as a whole, I think you'd have to compare most of Australia to the Sahara Desert."

"I think that wireless will save the day, high-speed versions of CDMA and GSM. I understand that the higher speed version of CDMA is just about ready, you just have to pay an extra amount to upgrade your cell power and you've got a higher speed connection. It's essentially ISDN speed. I think that should suit Australia very well, and politically it can be funded from the sale of Telstra, for example. And that might come along and save the government's bacon."

Do we really need it?

A hacker who altered the Australian Broadcasting Authority's Web site in early December left two complaints — one about censorship and the other about the slow appearance of high bandwidth connection methods in Australia. The issues have become linked in people's minds and bandwidth is becoming an issue for online activism, but Worthington downplayed the importance of speed.

"I think people get hung up too much on bandwidth, especially for home users," he said. "If you don't have any access at all, then you've got a problem. [If] you can get 9,600 baud, at least you can do a lot of things on the Internet. If you can get 56K or something around that you can do quite a bit more. But at 9,600 baud you can look at Web pages and things like that, no worries, if you've got faster access you can have things like audio. I think the applications for higher bandwidth for consumers simply aren't there."

Plans such as the 'Clever Country' initiative of the 1980s and the current government's 'Online Australia' rely on a well-educated population that is skilled in the latest technology. Increasingly, our place in the ecommerce, software development and other high-tech industries depends on these skills. In turn, they depend on the viability of Net access and how easy it is for customers to use, but does this really require higher bandwidth?

Although it is desirable for consumers to be able to bring up a shopping site instantaneously rather than waiting 30 seconds, most of the current high-bandwidth applications are purely for entertainment. CD-quality online radio, full-motion video and silky-smooth gameplay are desirable, but not vital to the current online experience. However, bandwidth becomes more important when the user becomes adept at using multiple Internet sites at the same time — listening to 128Kbps SHOUTcast while shopping for CDs, or watching a video news bulletin while accessing news sites and downloading a new browser. In situations where households or groups of employees share a link, people need more than what a few modem connections can offer, and often more than they can afford.

Some customers entirely blame Telstra for keeping bandwidth prices too high in this country, when it clearly has no trouble making a profit from other services. These people believe that in an environment in which the government is gradually privatising the major national carrier and has an interest in keeping the share price high, it is unwilling to impose too many regulations and is allowing Telstra to get away with murder.

It's all very well to have higher bandwidth options available, but the customer numbers which can be supported depend on the bandwidth available on the rest of the network. The higher the bandwidth offered to each customer, the more network capacity needs to be increased to cope with the rest of us. Telstra's present overseas links cannot support a nation of cable modem users, but the launch of additional cable and satellite services, and the resulting price competition should coincide with an upgrade to overall capacity.

For the moment, most Australians are stuck at 56K or less, and for experienced users who cannot afford a move to the next level of Internet use, we are at a low point in online history. But we may simply be in the calm before the storm. Our national and international infrastructure is improving, our politicians' familiarity with the Internet can only rise, and even at modem speeds we do have a very strong skill base on which to build. The tyranny of distance will remain, but Australians have staked their claim in the online world and will not be left behind for long.



The brick-size Motorola modem brings high-speed Internet to Big Pond's cable customers; it may also be used by Optus.

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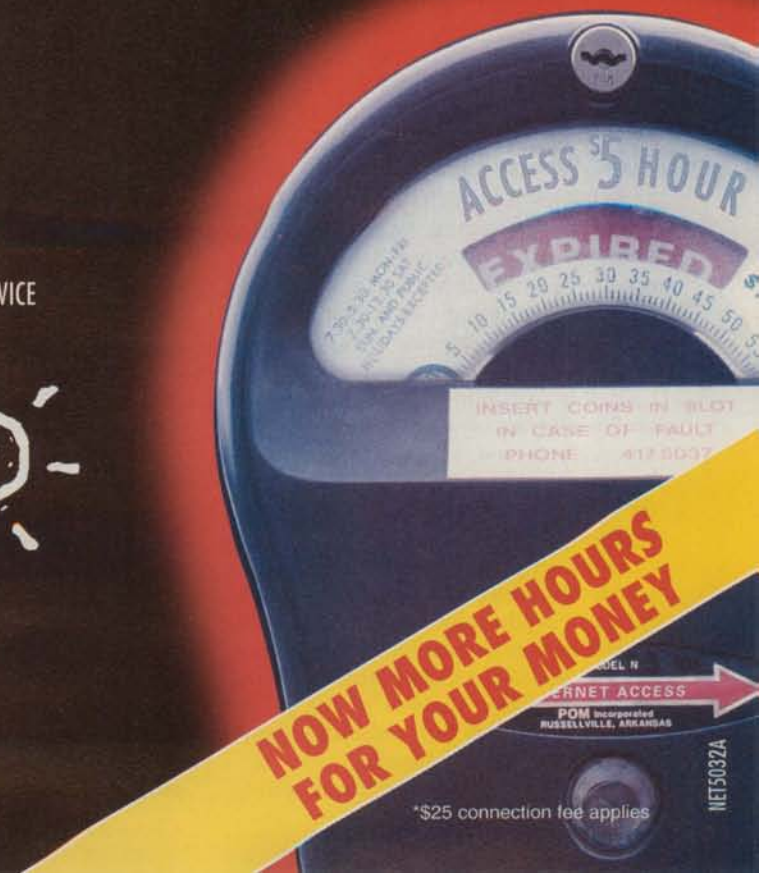
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FEATURE

BOOK FREEDOM

Although not yet available in Australia, 'ebooks' have established a foothold in the US. **Stephen Withers** discusses what you'd do with an ebook, and its potential impact on traditional book publishing. Is the paperback doomed? How many trees would be saved by the widespread adoption of ebooks? Read on.



The current generation of ebooks resemble oversized PDAs. The SoftBook Reader has a 6 by 8in LCD and weighs 1.3kg. A large button on the right-hand side 'turns' the pages backwards and forwards, and a leather binder balances high-tech with tradition.

NuvoMedia's Rocket eBook measures approximately 13 by 19 by 4cm with a 3.5 by 5.5in monochrome display. It weighs just over 0.6kg, and has two page-turning buttons.

Everybook's EB Dedicated Reader, due mid-year, has a different design. If you imagine a notebook computer with a second 12.1in screen in place of the keyboard, then rotate it 90° so the hinge is on the left instead of the top, you're almost there. Wrap it in a 30 by 23 by 5cm shell that resembles a conventional bound book, and you have the Dedicated Reader. If you'd prefer something smaller, a personal version measuring 23 by 15 by 5cm is planned for later this year.

There is not yet a clear and broadly accepted definition of the term 'ebook'. Sometimes it refers to a book that's available in any online or downloadable electronic form and therefore accessible on almost any PC. It is also used to describe a handheld device specifically designed for reading electronically distributed books, or the content intended for use in such a device.

In this article 'ebook' will refer to a handheld device, and 'ebook content' to the material you read on an ebook, although the term 'ebook reader' for the former and 'ebook' for the latter are just as likely to gain currency.

Although they are not yet being sold outside the US, ebooks are real and their impact is beginning to be felt. In the US, *Publishers Weekly* has for the first time received an advance copy from McGraw-Hill in an ebook instead of the paper galley (a printed but unbound copy) traditionally sent to reviewers.

The latest novel from "best-selling action-adventure writer" Bill Branon, *Spider Snatch*, was released by Huntingdon Press in electronic form two months before the hardcover edition. The electronic version cost $US10, as opposed to $US24.95 for the hardcover.

What, and why?

Like their paper cousins, ebooks allow the reader to make notes in the margin, highlight passages and place bookmarks. Ebook software has changed very little since companies such as Voyager started moving books onto CD-ROM in the early to mid '90s. The real difference is that we now have lightweight readers, online content distribution and encryption techniques to protect copyright owners' interests.

Apart from the familiar two-page spread, the Dedicated Reader is also distinguished by its use of colour displays, removable storage, Acrobat PDF files and Linux. PDF gives the publisher full control over the appearance of the content, as well as whether pages can be transferred to a PC or printed. Removable storage cards will be used, among other things, to deliver complete collections of books or journals, avoiding the need for lengthy downloads.

In order to allow people to try using an ebook without buying one, NuvoMedia has developed eRocket — a Windows-based simulation of the Rocket eBook — as a free download. Only free content can be used with the eRocket, as it lacks the security features of the real device.

In the US, NuvoMedia sells its Rocket eBook from its Web site and through shops at $US199 for the basic model, which holds 4,000 pages (10 novels). The Pro version costs $US269 and has a 19,000 page capacity and handwriting recognition software. An expanded memory version of the Rocket costs an extra $US149 and can hold about 36,000 pages or 90 books. Content is sold by barnesandnoble.com, Powell's Books and eCampus Books.

The SoftBook Reader and its content are sold directly by SoftBook, and this is reflected in the pricing model. The Reader, accessories and access to 100 "literary classics" costs $US599.95 or you can pay $US299.95 and sign up for a two-year "content package" at $US19.95 a month ($US778.75 in total).

Everybook has yet to ship its Dedicated Reader, but will be selling ebooks and content with dialup or Internet access to its bookshop and provision for unattended downloading. The expected price of the Dedicated Reader is $US1,600; the price of the personal model has not yet been announced.

None of the above companies have immediate plans to expand distribution outside of North America.

But do I want one?

Why you would want an ebook is another question. Gadget lovers will pounce on them, but if you just want a novel to read while you're travelling, you'll probably stick with a paperback. It weighs less, you won't be too upset if you lose it, you don't have to worry about battery life and the flight attendant won't tell you to put it away when the plane starts to descend.

An ebook is another item to carry. Just as a modern notebook computer eliminates the need to carry a CD player, a handheld computer is already close to matching an ebook. Librius believes the niche occupied by ebooks will disappear this year, when the display quality of general-purpose handheld devices will reach a standard acceptable for displaying ebook content. Consequently, the company has abandoned plans to produce its Millennium ebook, in favour of software for other platforms. Readers for Palm OS and Windows CE and a selection of titles (some free, many under $US10) is already available at Books2Read.com. Software for Windows, EPOC/Symbian, Mac OS and Linux is promised.



Are current ebooks destined to become collector's items?

There are two situations where ebooks, whether purpose-built or standard handhelds, could come into their own. First, there is a corporate and professional market for bulky reference material where network-based access is not appropriate for reasons such as security, reliability or bandwidth availability. Today's Rocket eBook can, if fitted with additional memory, hold up to 41,000 pages of text and graphics, or about 200 books. Potential users include field service staff, lawyers, medical personnel and students.

The second is ephemera: material that has a very limited life span in the hands of most readers. For magazines, an ebook could be a more satisfactory way of reading text-intensive material that is currently delivered to Web browsers. Examples of other media that fit into this category are most newspapers, any novel that you wouldn't read a second time and quickly outdated technical material such as computer books.

There are already signs that this will be an important application for ebooks. Rocket eBook owners can subscribe to Bloomberg; the *Industry Standard*; the *New York Times*' general news, book news and reviews; and the *New York Times Magazine*. Rocket editions of Salon, TheStreet.com and the Wall Street Journal Interactive Edition are also available. SoftBook users can access the *New York Times*' TimesFax service, highlights from the Wall Street Journal Interactive Edition, as well as *Time*, *Fortune*, *Money*, *InfoWorld*, the *Industry Standard*, *PC Magazine* and the *Federal Register*. The reading choices available to ebooks users will most likely broaden as the number of people using ebooks increases.

The future of book publishing

Several problems will affect the take-up of ebooks and their associated content. First there is the question of the reading experience. As none of the dedicated ebooks are available in Australia yet, all we can say is that broad acceptance of ebooks will require better displays than those on current notebooks and handheld devices. This may be achieved through hardware improvements, or new software technologies such as ClearType, which Microsoft claims will make "the words on your computer screen look as smooth as the words on a piece of paper." NuvoMedia, SoftBook and Compaq have endorsed ClearType.

Another problem is the position one must sit in to read from a notebook or desktop PC screen. The fact that an ebook can easily be held at a normal reading angle makes a difference.

There are also psychological considerations. Avid readers tend to be people who accumulate 'stuff' and take pleasure in owning books. Even though a personal library of about 200 books could fit into one ebook, many people would find that a far less satisfying alternative, regardless of the space saved. Perhaps this is a reflection of McLuhan's famous dictum that 'the medium is the message'.

Bandwidth and storage capacity do not appear to be big issues. Ebook content is relatively compact and can therefore be downloaded quickly, but *APC* expects Ethernet and USB interfaces to become more common anyway. We downloaded two books from Rocket-Library.com: *Dr Jekyll and Mr Hyde* and *Around the World in 80 Days*. The former was 70K and took under half a minute to download, and the latter was 194K and required just over one minute. Obviously, the file size will increase with the amount of text, and neither of these books contains illustrations. *Alice's*

Adventures in Wonderland, which is included with the eRocket, contains illustrations, and the 160-page book is a 335K file.

Some ebook content vendors are implementing a 'bookshelf' system that records all the content purchased by a particular customer so it can be redownloaded on demand.

Breakage

One of the problems with the current generation of handheld electronic devices is that they are not very robust mechanically. Dropping one onto a hard surface may crack the case, cause internal damage, and even if the LCD isn't broken, the impact can result in part of the screen permanently turning black. Reduced weight and increased flexibility will cut the risk of accidental damage, but books — especially paperbacks — require little care, and considerable damage must be done to them before they become useless. Dropping an ebook in the bath could see hundreds of dollars going down the drain.

Reports from the US suggest that current ebooks have a problem with battery life, just like earlier notebook computers and mobile phones. Also, while the screen resolution is acceptable, it falls short of what's really needed.

Another issue is that people often lend or give away a book or magazine when they have finished with it, and there is a sizable trade in second-hand books. Ebook content can be encrypted for use only on a specific ebook. It is obvious why publishers and some authors like this idea, but unless the price of electronic editions is pushed low enough, there may be consumer resistance to this practice.

Common standards are important. Publishers don't want to struggle with producing multiple versions of their content for similar media. From their perspective, it doesn't matter whether that standard comes about by industry agreement (as with DVD) or by market forces (as with VHS). Consumers have more to lose if things are left to the market. The decision quickly changes from 'which of these competing products would be the best for me?' to 'which is least likely to fall by the wayside?' In these circumstances, marketing savvy and market (or even political) clout can result in success for a second-rate product.

Fortunately, a widely supported standard has already been finalised. The Open eBook Standard 1.0 (OEB) is based on HTML and XML, and is backed by major publishers such as Bertelsmann and HarperCollins, as well as several other prominent names including Golden Books. There are a hundred or so organisations involved in OEB, including barnesandnoble.com, Microsoft, current ebook manufacturers and the US National Institute for Standards and Technology.

Although the specification makes provision for accessibility (eg. by allowing for audio) and internationalisation, it does not address security (ie. copy protection) issues. Consequently, documents created in accordance with OEB will need an electronic wrapper to take advantage of the encryption facilities provided by different ebooks. For example, SoftBook has created a tool that converts OEB files into the compressed and encrypted SoftBook format. In the longer term, this



It's too early to say how ebooks will stack up against 'dead tree editions'.

may be solved by an encryption standard called Electronic Book Exchange (EBX). Promoted by Glassbook, EBX addresses issues surrounding the temporary or permanent transfer of ebook content.

Major shift

As with much of the electronic economy, the switch from books to ebooks transfers capital and running costs from the producer to the consumer. In the old model, the supply side invested in printing presses and so on, and the product was self-contained. Now, consumers are expected to invest hundreds or possibly thousands of dollars in hardware so they can access the product or service. Although this raises equity issues, the ebook industry may follow the example of the mobile phone industry and subsidise the hardware cost by raising the cost of accessing content. This is likely to involve some kind of lock-in to a publisher. In the longer term, ebook prices will probably reach generally affordable levels.

Ebooks reduce the entry barriers to the publishing industry, but people might be reluctant to buy ebook content from unfamiliar names sight unseen. Parallels can be seen in the software industry, where shareware and demo versions let people try before they buy. Authors sometimes use the honour system for ebooks intended to be read on a computer, but this is rare. Making the first chapter or two available for online reading or download is more common.

When all is said and done, electronic distribution should be substantially quicker and cheaper than paper, especially as it avoids the cost of unsold copies. This will drive the transition.

Microsoft is pushing an aggressive timeline for ebooks, predicting that over 1 million ebook titles will be sold this year following the introduction of its Reader software for desktop and notebook PCs. It predicts that by 2003, ebook prices will range from $US99 for a small monochrome device to about $US899 for a magazine-size colour model. By 2005, the ebook and 'eperiodical' market is predicted to reach $US1 billion, and another $US1 billion in advertising revenue will support free publications, all reaching an audience of 250 million regular 'ereaders'.

Commenting on these forecasts, analysts from Butler Group did not take issue with the optimism expressed by Microsoft, but concluded: "Once the standards are sorted out, then publishers will have the confidence to convert material, and consumers can rest assured that the e-book they choose will deliver a wide range of content . . . Butler Group believes that the portable technology . . . is about to catch up."

What price content?

The price of ebook content has yet to settle down. Vendors talk about distributing cost savings between authors, publishers, booksellers and readers, but this rhetoric has yet to be proven.

For example, Frank McCourt's *'Tis* costs $US15.50 from SoftBook and $US20.80 from barnesandnoble.com as a Rocket edition. The hardback's regular price is $US26, discounted to just $US13 at barnesandnoble.com. Locally, it costs $36.95, discounted to $29.95 by Collins Booksellers.

There are three price levels at present for ebook content. Free titles are mainly out-of-

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copyright works or books by undiscovered authors, much as new bands release music in MP3 format. Budget titles cost a few dollars, and tend to be similar to those in the free category. Finally, there are 'full price' editions of current — sometimes even the latest — books. This category is also used to continue the availability of books that have gone out of print, something that is especially encouraged by Librius.

There are two basic models for loading content into an ebook. The Rocket uses a PC as an intermediary: you download content from vendors' Web sites to the PC, then transfer it to the Rocket. The alternative, as used by SoftBook, is to include a modem or Ethernet interface so the ebook can connect to the Internet and then to an ebook shop. A one-step download is obviously more convenient, but putting a PC into the loop provides a local backup copy of the content.

bringing a new meaning to self-publishing. The problem is becoming established in the first place, but just as some shareware authors have managed to establish successful (or at least ongoing) businesses despite the presence of software giants, some new authors are expected to succeed by going their own way.

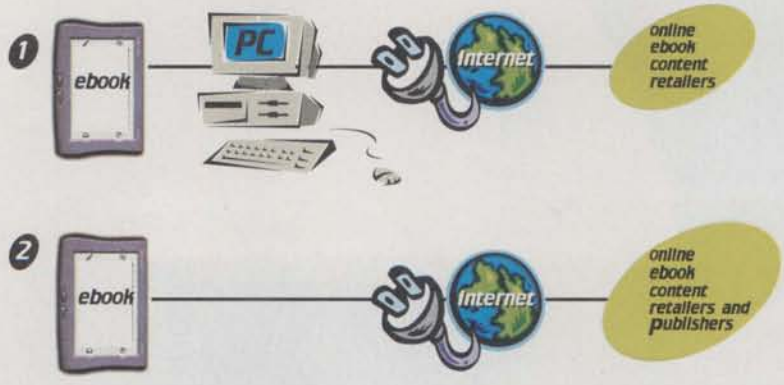
So far, a very small proportion of the world's books is available electronically. For the Rocket, Powell's Books lists 2,256 titles and there are another 2,248 freebies in the Rocket-Library. The latter are mainly classics, often converted from the Gutenberg Project, but there are a few non-English titles.



A 160-page, illustrated copy of *Alice's Adventures in Wonderland* is just a 335K download.

SoftBook has 1,548 books in its catalogue. This is a mixed bag: fiction and nonfiction, classics and current titles. As for the Rocket, SoftBooks' titles appear to contain more old works than new ones. It's difficult to tell exactly how many titles are available at Librius' Books2Read.com beta site because of the overlapping categories, but there seems to be over 300. Romance is easily the biggest category. Because the market is so new — Forrester Research describes the installed base as "incredibly small" — industry analysts have yet to produce estimates of its future potential or to profile ebook users.

The two ebook connectivity models



The first model provides a local backup copy of downloaded titles; the second is a more direct way of loading content into an ebook.

The publishing model

There are some major publishers involved in the ebook content industry, along with some big names in US bookselling. Given that the devices have yet to go on sale here, it's not surprising that there isn't much activity on the content side. Dymocks' Web site currently only sells items stocked at the company's main shop which does not include ebook content, but the company is aware of the possibilities. Collins Booksellers did not respond to our request for information.

Ebooks are a bigger threat to our booksellers than offshore suppliers such as Amazon. Selling content is a pure ebusiness opportunity unhampered by the shortcomings of international shipping. Publishers could bypass real or virtual bookshops. Established authors could bypass publishers and booksellers,

The ecological angle

Some very rough calculations suggest that 230,000 trees would have been saved if just 10% of the books sold in the US in 1998 had been shipped as ebook content. A proper analysis would allow for the use of recycled paper and the use of rag and other materials for papermaking, but it is apparent that a lot of timber goes into 'dead tree editions'.

Everybook makes a big play of the environmental effects of traditional publishing, quoting US government statistics showing that the paper industry is responsible for the third-largest volume of toxic pollutants, and printing and publishing ranks 11th. The chemical industry, which makes ink, tops the list. The computer and electronics industry has its own environmental problems. The US Environmental Protection Agency reports that it released over 4.3 million pounds — 1,954 metric tonnes — of solvents, acids, ammonia and heavy metals in 1995 (the latest figures available). However, it is apparent that a switch to ebooks would reduce the environmental effects of the book publishing industry, especially once the hardware is developed to the point that people no longer feel compelled to frequently replace it.

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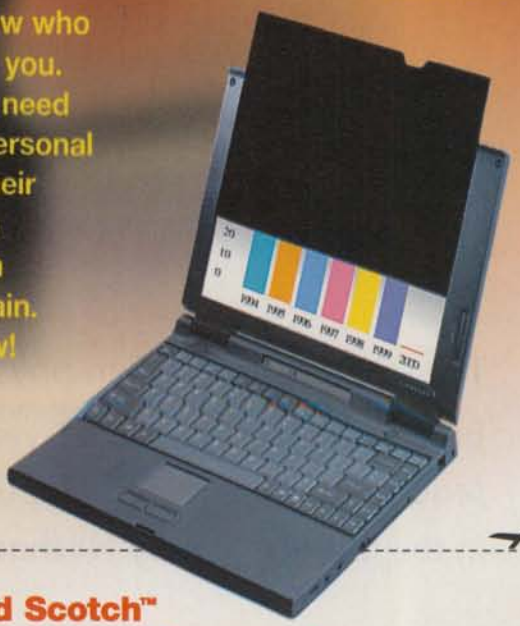
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QUANTUM LEAPS

The science of quantum physics has been a research topic for more than 70 years, but it is only in the last 20 years or so that its application has received much serious attention. The computer world only began to turn its attention towards it in the last decade. **By Nathan Taylor**

Until now, computer manufacturers have been able to meet the demands of Moore's Law, which predicts that computing power will double every 18 to 24 months. Recently, however, the realisation that physical barriers are going to bring Moore's Law to a screeching halt within the next 15 years has been permeating the industry. It seems a long way off, but chip manufacturers are used to dealing with problems years in advance.

Today's best lithographic techniques can produce chips on 0.18-micron design rules, and a few fabs can even produce 0.15-micron chips. In research laboratories, chips with paths as small as 0.07 microns have been produced, although the economics of bringing such chips to market is another matter. It's generally accepted that you can't go past 0.05 microns without running into some very serious physical barriers, not the least of which is a the quantum mechanical effect of tunnelling, which causes particles to take on a 'fuzzy' position, meaning that there is a probability that they will appear *outside* the silicon pathways. It sounds weird, but that's the world of quantum mechanics.

Therefore, chip manufacturers are considering new methods of building computers, and many are turning to quantum physics for a solution.

All things at once

Much of the focus for the application of quantum computing has been on developing systems which use the unique nature of superpositioning.

One of the key principles of quantum mechanics states that before a particle is observed, it exists in a state that is indeterminate. In effect, the particle exists in all states simultaneously — a condition known as superpositioning. It is only when it is observed (or read) that a particle collapses into a state that is quantifiable.

Superpositioning means that, at least in theory, a set of particles can represent all values with a particular range, and that a single operation can operate on all those values simultaneously. A set of eight quantum bits (qubits) actually represents 256 values *all at the same time*, and operations can affect all those states. As long as the quantum state is not read, any operations will affect all its possible states, rather than a single state.

Hopefully, what this means in practice is that qubits can be used to achieve massive parallelism. Trial and error operations (such as searching databases or factoring numbers) or operations in which the same calculations have to be performed on a large set of values can benefit from this particular application of quantum computing.

The answer is in there, somewhere

All this knowledge, of course, would be somewhat useless if there was no way to control the output of the quanta: what's the point, when you're only going to get a random answer when you sample the state of the qubit? And how, then, do you operate on the qubits without reading them, which would *decohere* the delicate quantum state.

Fortunately, it is possible to manipulate the qubits to nudge the readout in the direction of the desired answer.

An electron in a magnetic field, for instance, has two spin states, which could be observed as bits. It acts like a tiny magnet. One moment its magnet points up, the other down, which can correspond to 1 or 0. By applying some energy, you can actually flip the magnetism of the electron, making it represent the opposite value.

When a very small amount of energy is applied, however, something unusual happens. The *probability* of observing the electron in either an up or down state varies. An electron could be made to have a probability of 65/35 for up/down results, for instance.

The pioneers of quantum computing hope this method can be used to attain an answer to problems that would otherwise take a large number of speculative calculations.

As an example, consider a linear database that consists of 1,000 entries. To find a particular record in that database, a regular database might have to go through the entries one-by-one, comparing the search criteria against each entry. A modern computer wouldn't take long to go through a thousand entries. But what about a million? A billion?



Meanwhile, a quantum computer should be able to sort through any number of entries with a few operations. The superposition of the qubits, which allows it to test all entries simultaneously, means that the answer is already in the array of qubits — you just need to know how to extract it.

Algorithms to make use of the superpositioning of qubits are already in place. Lov Grover of Bell Labs in New Jersey has developed an algorithm to search databases. Radio waves are used to 'nudge' the probability of the qubits in the desired direction to get a result in a fraction of the number of cycles it would take for a conventional algorithm. On average, a conventional algorithm would take half as many tries as the number of database entries to successfully find the result. Using Grover's algorithm, it would take the square root of the number of entries. For very large databases, this would make a vast difference.

Of course, having those algorithms is all very well, but without a practical environment in which to apply them, they remain pure theory: software without hardware to run it. The development of a system that is accurate enough to manipulate qubits is still a long way off.

Temperature is one problem. Current experiments are being conducted in environments too far below room temperature to be practical. Even more pressing is interference, as the delicate quantum states are difficult to maintain in anything but a vacuum. Most experimental devices have lost coherence very quickly.

However, hardware may not be all that far away. Late last year, NEC researchers in Japan demonstrated a controlled qubit contained on a silicon chip. An electron was stored in what is called a quantum dot, a magnetic well that can store single electrons or small groups of electrons. By applying a voltage, the researchers forced the electron into a superposition, which they claimed lasted for about 2 nanoseconds — not long, but long enough to perform about 25 operations on the superposition. Of course, that computer still had to run at near 0° Kelvin (-273.15°C).

The next challenge is to perform operations on arrays of qubits, then have the device operate at room temperature and sustain the superposition longer.

Quantum logic gates

Of course, this parallelism only applies to certain types of operations. Most common applications will never be able to use the superposition feature of quanta to produce usable information. If this were the only application of quantum physics to computing, then the technology would only be useful to a limited number of application-specific supercomputers, such as weather prediction systems or encryption-cracking devices (see 'The threat to encryption', page 82). The day-to-day benefits of such technology would be minimal.

However, scientists at Hewlett-Packard, IBM and elsewhere have already demonstrated that it is theoretically possible to

use quantum states to develop logic gates.

Logic gates are the magic sauce that makes current computers work. They take binary input values and perform Boolean operations on those values. An AND gate, for instance, receives two inputs, and will output a binary 1 only if both of those inputs are 1 (see Technobabble, page 113 for more information on logic gates). Using Boolean logic, all the computer's mathematical functions are possible.

It has already been proven that a XOR gate can be built using the principles of quantum physics. Depending on a controlled state, a qubit can be made to flip its spin. That is, one particle can be made to read out either a one or a zero, depending on the current state of another particle.

Mathematically speaking, by combining two XOR gates and the third single qubit operation, it is theoretically possible to build the other types of logic gates to create a 'classical' computer in which the full set of logical operations are possible.

The advantages of doing so are unknown at this time. They will almost certainly be smaller, but will such computers be any faster than conventional systems? We're still waiting for the prototype.

Quantum teleportation

Without some kind os space-warping technology, particles can never travel faster than light; Einstein's special theory of relativity says so. Therefore, faster than light communication should not be possible.

But even Einstein observed a phenomenon he once described as 'spooky'. Two particles in a system have been shown to exhibit complementary quantum behaviour even when separated by large distances.

It's called quantum entanglement, when two particles — experiments usually use photons — become part of the same system. (Incidentally, entanglement will also be a key feature of massively parallel quantum computers — which makes sure the quanta involved operate as a system, rather than as individual entities.)

An entangled state occurs when particles pick up the characteristics of other particles. The most practical way to manufacture such particles is to fire protons (light) through a 50/50 beam splitter.

The particles act in unison at precisely the same time, regardless of the distance that separates them, similar to the way twins often have an inexplicable connection, no matter how far apart they are. The particles could be on opposite sides of the universe and still act at exactly the same time.

The potential communications applications of this principle are astounding — literally instantaneous communications between two points at any range.

This is known as quantum teleportation — the transference of states between two quanta without an apparent exchange of energy. It's not teleportation as seen in sci-fi movies; no actual matter or energy is transferred, only the state of entangled quanta.

Experiments at the University of Innsbruck in Austria have shown actual teleportation in practice. Entangled photons



are used to 'communicate' between two points. In the experiments, the two stations were only a few feet away from each other, but in theory they could have been any distance from each other.

In spite of this, there are significant barriers to its use, which will require a serious breakthrough before any technological application of the principle is seen. The Innsbruck experiment required standard communication between the end stations in order to mediate the exchange (which defeats the whole purpose of the exercise).

The uncertainty principle also poses problems. One use, as the entangled particles collapse into the read state, means that entangled particles are likely to be one-shot deals. One possible application is to have a kind of reactor constantly 'manufacturing' entangled protons, and splitting them off to their destinations. The constant stream would travel at normal rates (light speed), but would provide a source of entangled photons.

There would be latency — you would have to wait for the first protons to arrive before communications start — but following protons would provide instantaneous communications between pairs of entangled protons (remembering that the protons are the *means* of communication, not the actual message).

Theoretically, entanglement could also be applied to macroscopic objects to make actual copying of objects between two points possible — a topic currently being researched at IBM and elsewhere. Still, science has not yet fully explained why these reactions happen only in the microscopic world — macroscopic objects, like people, are not subject to superpositioning. That's why quantum weirdness does not affect our everyday lives.

Quantum memory

Single electron memory is the ultimate goal of memory manufacturers — you can't get much more memory density than that, unless you start considering reading particles with more than two states.

A development coming out of quantum mechanical research is likely to provide the means to that end. Quantum dots, made of aluminium and an insulating layer, can be made to contain single electrons. They can be made so small that hundreds of times more memory can be packed onto a single slice of silicon than current designs. At the simplest level, the presence, or lack thereof, of an electron may be used to represent a 1 or 0.

Using the spin of electrons may also provide a means to provide long-term, non-volatile memory. Earlier we mentioned the spin of an electron, how it can be read as either 'up' or 'down' (representing 1 or 0) and how it can be manipulated. For the past several years, the US Department of Defense and a number of other organisations have been pouring a lot of money into a research field called 'spintronics'.

Using ferromagnetic metals, it has been possible to polarise the spin of electrons passing through metals. These electrons can then be held in tightly packed magnetic fields that have up to 100 times the bit density of today's memory systems. What's more, the spin polarity will remain the same when the system

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The threat to encryption

We may never see a quantum computer. Regulatory bodies, already paranoid about the capabilities of modern computers to decrypt passwords and break into government systems, may well put a ban on the development of such computers. The US even has regulations in place now preventing the export of very powerful computers — a law that IBM recently ran foul of.

But even today's most powerful computers don't come near the potential power of quantum computers to crack codes. The implications of quantum computers for security systems are truly mind-boggling. If it proves possible to manufacture a quantum computer capable of factorising very large numbers quickly, our existing public encryption and authentication systems could be rendered vulnerable. A very scary thought indeed.

Quantum factorisation

The fundamental issue boils down to the way the vast majority of encryption systems work. They are based on a very simple mathematical principle: the difficulty in factorising very large numbers.

Take the number 377. Work out which two prime numbers multiply to equal that number. You have to resort to trial and error to find them, right? There aren't many algorithmic principles you can apply to get the correct number.

On the other hand, testing the solution is easy once you know it. Simply multiply the two factors together, and if the number equals 377, you have the right answer. So testing the answer is simple, but finding it is not (to save you time, the answer is 13 and 29).

This is the basis for most public-key encryption schemes. The public key is the number, while the private key is the factors. If you want to actually read the information being sent, you have to know the factors. Now you can try to find them by trial and error, but when you get to very large numbers (potentially hundreds of digits), you have an astronomically large number of possible combinations to try. The chance of finding the correct keys with a few tries — or even a few billion tries — is miniscule. Put enough processing power into the problem for long enough and the answer can always be found, but for high-level encryption this could take years and millions of dollars worth of computing equipment.

The highest level of encryption to have ever been cracked is a number comprising 140 bits. Typically, modern industrial-strength encryption has a public key of 128 bits (which, in decimal, translates to a number up to 39 digits long), while, due to US export restrictions, browsers generally support 56 to 64-bit keys (a 64-bit key has up to 20 digits).

However, quantum computers present a new problem for encryption schemes. Because an array of quantum bits (qubits) can exist in an infinite number of states, the answer to the problem lies in the system somewhere. With the proper manipulation, a quantum computer could theoretically be designed that produces a correct result with far fewer stages than a trial and error method — in other words, high-speed factorisation. For the criminally minded, this translates as high-speed encryption cracking.

In 1994, a mathematician at AT&T by the name of Peter Shor discovered the means by which quantum parallelism can be applied to factorising. Using a complicated method of pushing the quanta in the direction of the factors, the algorithm can theoretically produce factors billions of times faster than trial and error factorisation. Where a conventional computer would take thousands of years to crack a 200-bit encryption code, a quantum computer might be able to do it in a couple of hours.

A solution

Fortunately, means other than factor-based encryption exist, which may be less vulnerable to quantum factorisation.

Perhaps the best solution lies in an encryption algorithm developed by Charles Bennet and Gilles Brassard, from IBM and the University of Montreal respectively. This algorithm also uses quantum principles. Rather than sending data in the form of electronic pulses to represent ones and zeros, theoretically photons polarised to represent values can be sent between parties. They can be intercepted, but cannot be interpreted with certainty without the proper filters. The filters can be exchanged beforehand.

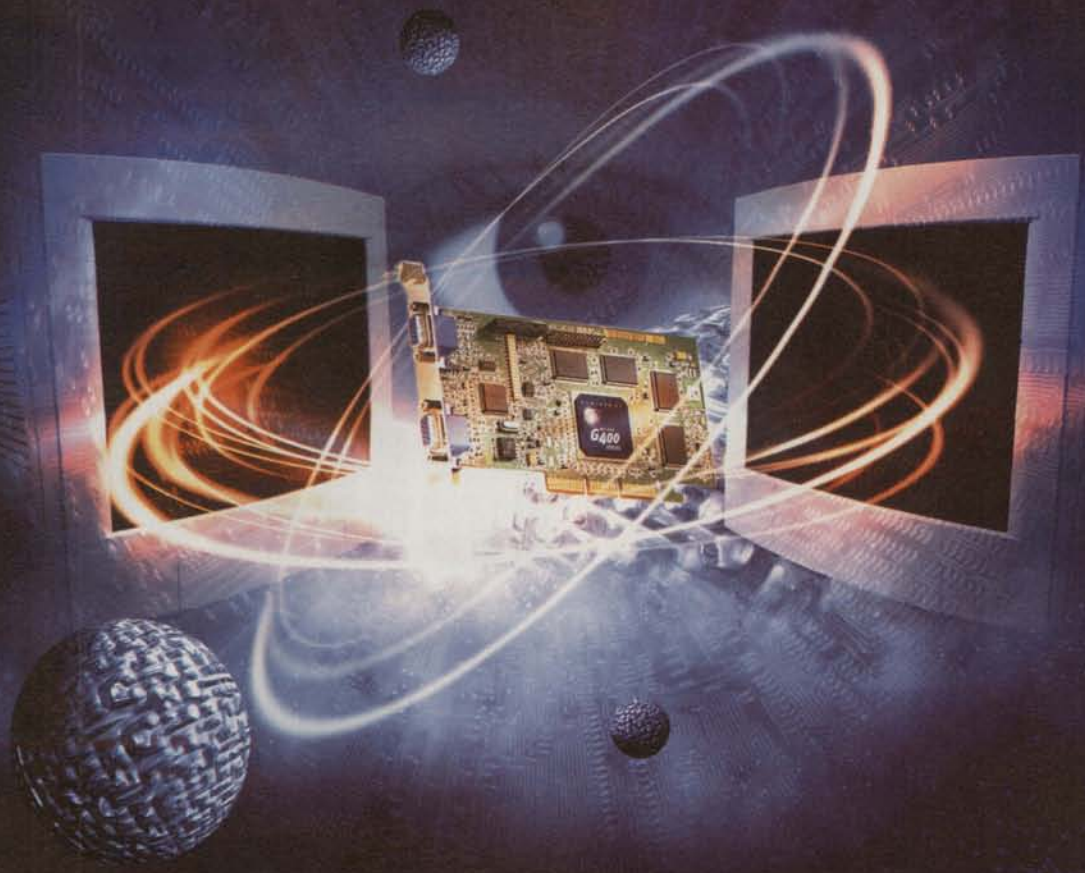
In addition, reading them would destroy the particle's quantum state. The interceptor could retransmit polarised photons to avoid detection, but because of the bizarre way quantum physics work, the interceptor cannot be sure that they have sent the correct orientation. Therein lies the trick: if the intended sender and receiver can work out a complementary filtering system, then the transaction should be secure.

Of course, working that out with the eavesdropper overhearing their system could prove difficult without working out an exchange system beforehand. Bennet and Brassard have worked out a system for dynamically building filters for the end parties, which, though a little complicated, should work.

is without power (making it a very effective alternative to flash memory), the power consumption of such devices is a tiny fraction of conventional memory (reducing heat), and access times are incredibly fast.

Already, functional devices have been demonstrated, although they are not yet up to the standards of conventional system memory. Honeywell has demonstrated memory modules with 100-nanosecond access times, which is not as fast as conventional SRAMs, but much faster than most flash memory, which has access times measured in milliseconds. The prototype memory was also only demonstrated in a 16-kilobit package (2K) — a lot more capacity than that is needed to store MP3 files on your Rio.

The area of memory devices, as with all things in relation to quantum mechanics and quantum physics, is still only in its early days. Scientists have only begun to explore the immense potential of quantum computers, and we've only touched on some of the more conventional research here. Hundreds of other approaches are being researched around the world. Quantum mechanics represents a potential new paradigm for computing, ready to be applied to novel computing models like neural nets as well as conventional computing. But we're still waiting for the major breakthrough that will make it all possible.■



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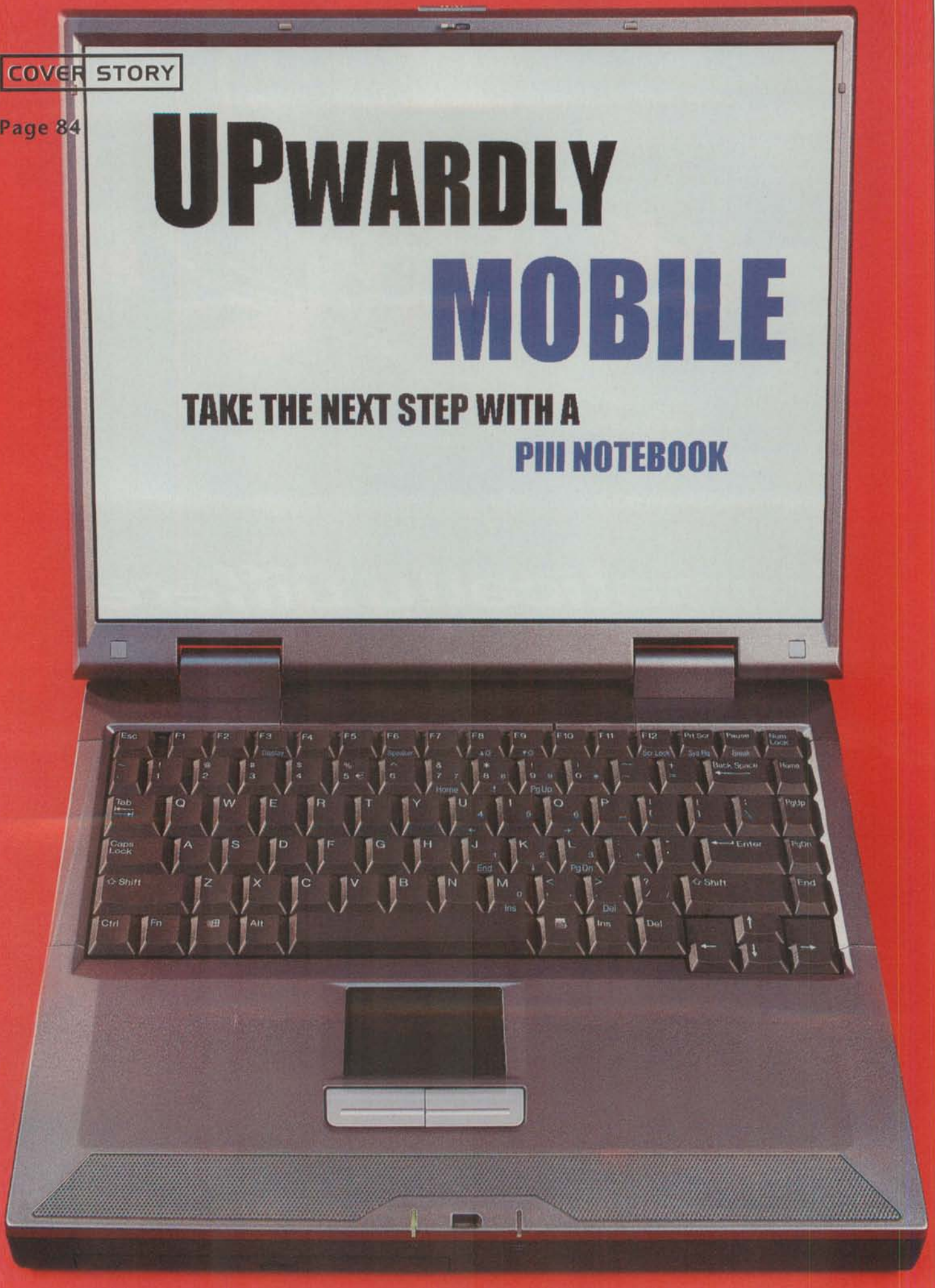
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COVER STORY

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UPWARDLY MOBILE

TAKE THE NEXT STEP WITH A PIII NOTEBOOK



NOTEBOOK REVIEWS



It has been almost a year since the Pentium III processor was unleashed on a weary world, but many still eagerly awaited the Katmai in a notebook. The long wait is now over. *APC* Labs put a slew of the newest Pentium III notebooks on the rack to see how they fared. **By Darren Ellis**

There has been only one notebook with the new mobile Intel Pentium III processor reviewed by *APC* in the past (see *APC* December 1999, page 34). This time around seven were up for review, and the chips ranged from 450MHz up to the newly released 600MHz. Some of the notebooks we put to the test were so new they were not yet in production and were unavailable to the public at the time of review.

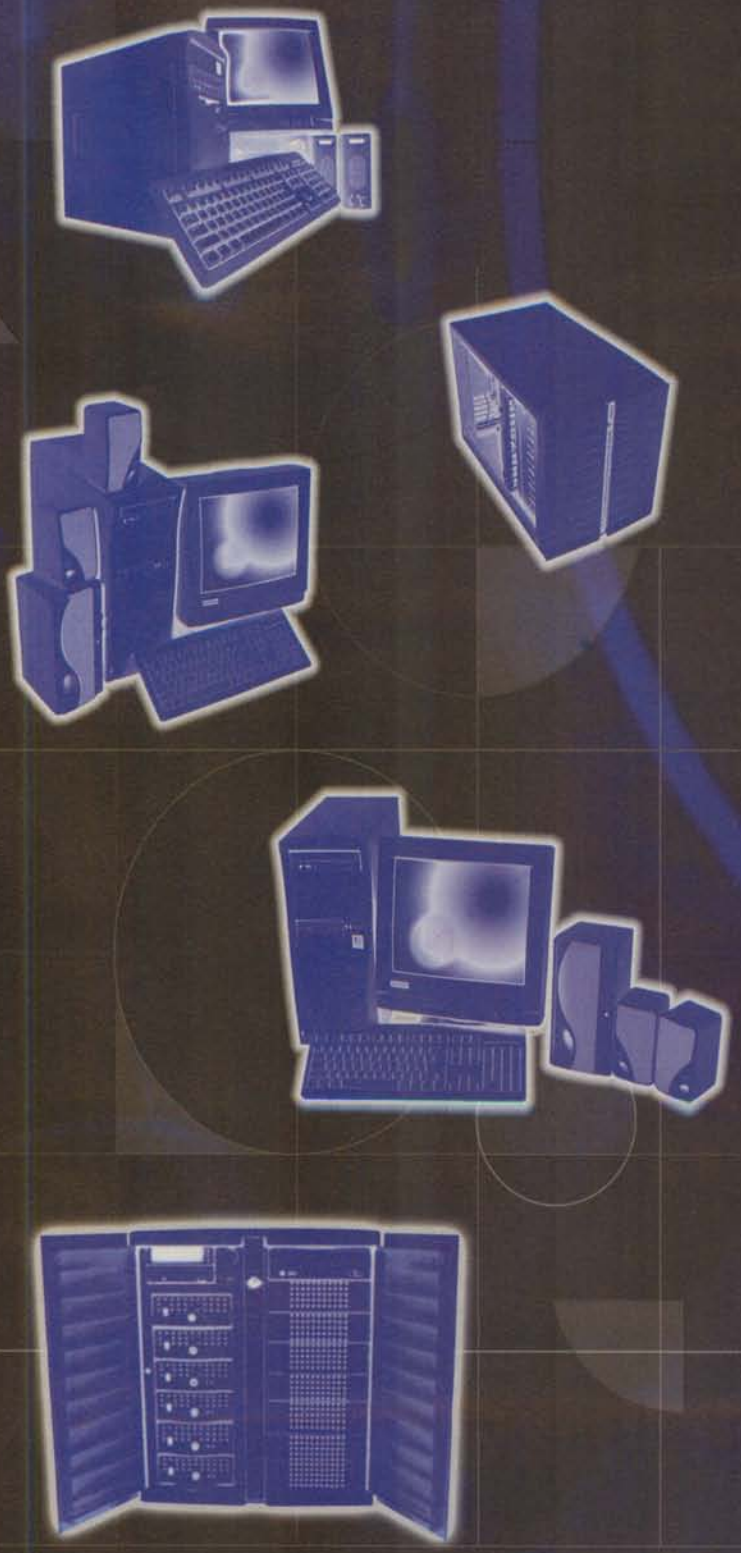
The engineering samples *APC* reviewed — which will differ slightly in terms of aesthetics and performance in their final release versions — are the IBM ThinkPad 390X, the Compaq Armada M700, the NEC Versa LXi and the Gateway Solo 9300XL. By the time you read this, all the kinks should have been ironed out and these notebooks should be ready for retail sale.

The specifications for inclusion in the review were very broad: notebooks with Pentium III processors, a minimum of 64M of RAM and Windows 98 installed. The benchmarks used by *APC* determine the best purpose for each notebook, and even assess how well the notebook is designed for its intended use. A big display or large hard drive does not necessarily make a notebook ideal for business use. The same goes for a home notebook — lots of video RAM and a DVD-ROM drive means little if it struggles with the most basic task.

Some of the units reviewed would be great for home use, but many were aimed at the corporate/business markets. An increasingly common buzzword, especially with the release of faster and more powerful mobile processors, is 'desktop replacement'. Not many notebooks earn this title; many manufacturers apply the term desktop replacement to a notebook that offers the best capabilities of a desktop: fast speed, big screens and high capacity. The NEC Versa LXi comes close to this, but for a notebook to be a true desktop replacement it would also need to be inexpensive.

When a new 'faster-better-bigger' processor is released, the two biggest headaches for notebook manufacturers are keeping the hungrier chip cool, and maintaining a long battery life. Innovative notebook designs and better fans are addressing the heat problem, but battery life is still far from perfect. The battery life of some of the models reviewed would turn the average road warrior into a road worrier. Three of the reviewed units were able to crack the four-hour barrier, but three of the remaining models were unable to run for over three hours (clearly a problem if your work involves a lot of travel).

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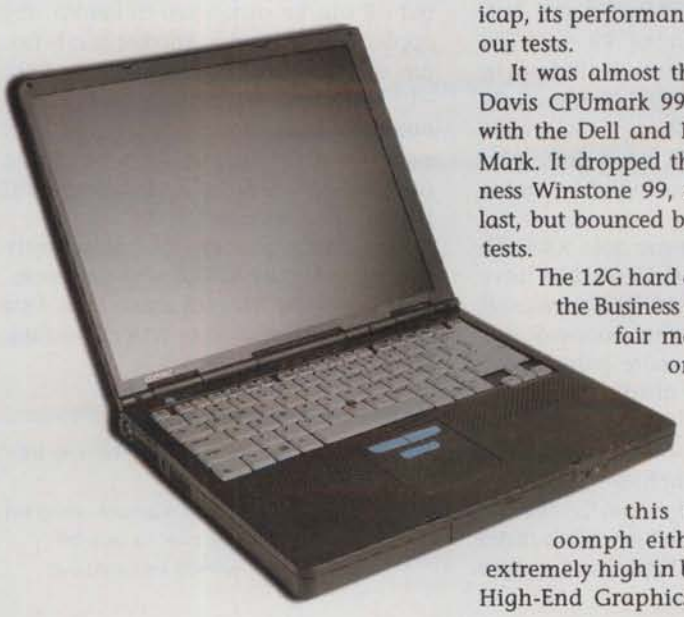
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ATC-91000001

Compaq Armada M700

In the past, the Compaq Armada notebooks that have been submitted for review were mostly slow and cumbersome. Compaq has bucked this trend with the M700, which is neither lethargic nor chunky. It is the slimmest unit in this review, 1.1cm thinner than the next slimmest notebook.



The review unit sent to *APC* was an engineering sample, and therefore not quite up to the standard of the retail product, which should be available by the time you read this. Despite this handicap, its performance was very strong in our tests.

It was almost the fastest in the Ziff-Davis CPUmark 99 test, and equal first with the Dell and NEC in the FPU WinMark. It dropped the ball with the Business Winstone 99, coming equal second last, but bounced back in the hard drive tests.

The 12G hard drive scored highest in the Business Disk WinMark 99 by a fair margin, and came second in the High-End Disk WinMark 99 with a highly respectable score.

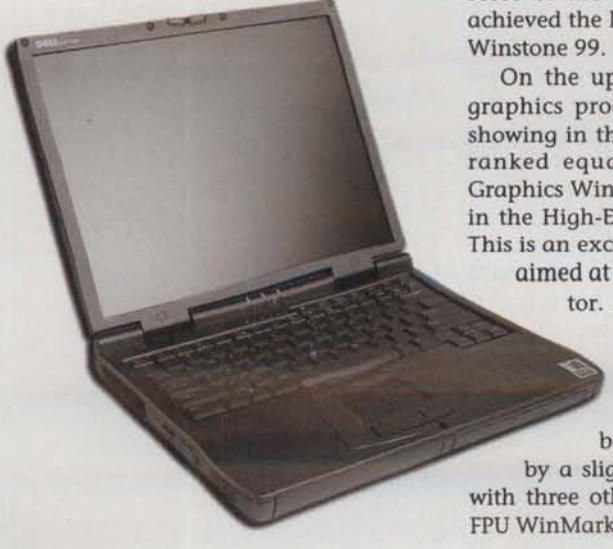
You can't fault this unit for graphics oomph either. Its results were extremely high in both the Business and High-End Graphics WinMark 99 tests, and very good in the 3D Mark 99 Max test. The slimness of the notebook makes the 14.1in TFT screen seem larger than it is, and it is a joy to watch DVD movies on. With a TV-out port, you can even watch those movies on your lounge room TV, or show presentations on a big screen.

Even though this notebook is fast, light and slim, its battery is nothing to boast about. It only lasted two hours and 20 minutes. This is the shortest life span of any of the notebook batteries and not nearly enough for the road warrior who has long gaps between power points. However, Compaq has done something right with the Armada M700; it may be costly, but you get power in a slim form.

Distributor	Compaq
Phone	13 23 93
Online	http://www.compaq.com.au/
Price	$7,995
In short	A very good notebook; the finished product should be even better.

Dell Latitude CPx H500GT

This is another notebook with a mix of good and bad test results and qualities. The Dell Latitude CPx H500GT is attractively priced and has the Dell name behind it, but some of its test results leave a lot to be desired.



The most marked failing is the hard drive, which has the dubious honour of coming last in both the Ziff-Davis Business Disk WinMark 99 and High-End Business Disk WinMark 99 tests. In the latter test it reached only two-thirds of the score of the next fastest drive. It also achieved the lowest score in the Business Winstone 99.

On the upside, its ATI Mobility M1 graphics processor produced a strong showing in the graphics benchmarks. It ranked equal third in the Business Graphics WinMark 99 and equal second in the High-End Graphics WinMark 99. This is an excellent result for a notebook aimed at the business/corporate sector. Although it didn't get the highest score for 3D Mark 99 Max, it rated well enough for playing games.

It was the fastest notebook in the CPUmark 99 test by a slight margin, and equal first with three other 500MHz models in the FPU WinMark.

Dell has slowly improved its notebook designs, and the Latitude CPx H500GT is a very well-designed unit. The keyboard is large and friendly, and both a trackpoint and a glidepad mouse pointer are installed — a great feature.

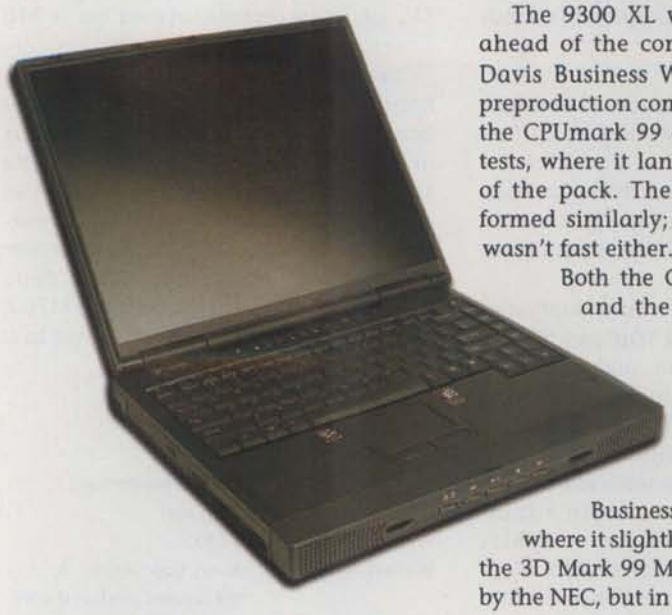
For DVD fans, there's a TV-out connection on the side. Dell has done away with covers for the connectors on the back of the unit. According to its customer feedback, they are the first things to break on a notebook.

For a while, Dell seemed to be following the Gateway lead with longer and longer battery life. This notebook, however, did not last as long as expected; its running time was only two hours and 46 minutes.

Distributor	Dell
Phone	1800 800 312
Online	http://www.dell.com.au/
Price	$6,087
In short	Could do with some tweaking, but not bad for the price.

Gateway Solo 9300 XL

This notebook had the fastest and meanest processor. Its 600MHz clock speed is more than 100MHz faster than its nearest rival. The performance difference was not as high as anticipated, but as an engineering sample (and a very early one at that), this is due more to the notebook's preproduction innards than any shortfall with the processor. Once Gateway has packed it with the final components it should blaze along.



The 9300 XL was almost six points ahead of the competition in the Ziff-Davis Business Winstone 99 test. The preproduction components let it down in the CPUmark 99 and FPU WinMark 99 tests, where it languished in the middle of the pack. The 12G hard drive performed similarly; it wasn't slow, but it wasn't fast either.

Both the Gateway Solo 9300 XL and the NEC Versa LXi have 15.1in screens, but the Gateway has more grunt in the graphics department. This was reflected in the Business Graphics WinMark 99 where it slightly edged out the NEC. In the 3D Mark 99 Max test it was trounced by the NEC, but in the High-End Graphics WinMark 99 test it blitzed the competition by a healthy 43 points.

One of the new design features with the Solo 9300 XL is the four unobtrusive shortcut keys placed above the keyboard. Three of these are preset to open an email package, Web browser and CD/DVD program, but all can be customised to launch any application you desire. Another handy feature is the CD/DVD buttons across the front edge of the unit, which can be used with the notebook shut. However, *APC* has seen examples of this that were better designed (see IBM ThinkPad i Series 1480 review, *APC* January, page 40).

Very long battery life has recently become a feature of Gateway notebooks. The Solo 9300 XL lasts more than four hours, which makes it perfect for travelling.

Distributor	Gateway
Phone	1800 500 742
Online	http://www.gw2k.com.au/
Price	$6,499
In short	A great notebook, which will only improve once the wrinkles are ironed out.

IBM ThinkPad 390X

IBM's ThinkPad range varies widely in quality. Some, such as the ThinkPad 600, are slim, portable devices. The 390 range is sturdier, but still portable.

The newest addition to the IBM ThinkPad 390 range is a fairly standard, no-frills business machine. The Pioneer Powerbook, the only other notebook reviewed with a 450MHz processor, is an inferior machine despite having twice the RAM of the IBM. The ThinkPad 390X's processor rated near the bottom of the rank in the CPUmark 99 and FPU WinMark 99 tests, along with the Pioneer.

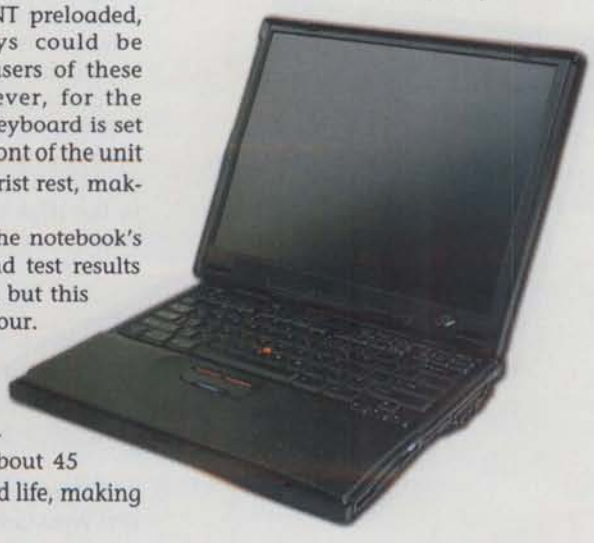
The ThinkPad 390X was the weakest performer in the Ziff-Davis High-End Graphics WinMark 99. It was also one of two notebooks that could not be coaxed into producing a 3D Mark 99 Max result, but it should be adequate to cope with the everyday 2D tasks associated with being a business workhorse.

The sturdiness and sensitivity of the trackpoint make it one of the better mouse controllers, but the placement of mouse buttons has never been a strong point with ThinkPads. You can get used to it, but it's not something you *should* have to adjust to. A more relaxing and natural arrangement of the buttons is in order.

The notebook lacks any Windows hotkeys, which could be a boon or a curse, depending on your view. It comes with Windows 95, 98 or NT preloaded, and the lack of hotkeys could be extremely annoying for users of these operating systems; however, for the Linux user it's ideal. The keyboard is set back far enough from the front of the unit to provide a comfortable wrist rest, making it enjoyable to use.

IBM has excelled with the notebook's batteries. The rated life and test results diverged as much as usual, but this time in the notebook's favour. The ThinkPad 390X ran for the longest time of all the notebooks reviewed, clocking in at a hefty four-and-a-half hours. This is about 45 minutes longer than its rated life, making it perfect for the road.

Distributor	IBM
Phone	1800 815 154
Online	http://www.pc.ibm.com/au/
Price	$6,699
In short	Not a bad machine at all, especially for work.



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NEC Versa LXi

The NEC Versa LXi is a portent of good things to come. Even though it's a preproduction sample, there was little to fault with this notebook.

The most obvious drawback with the Versa LXi is the chunk factor. It's the biggest notebook in all dimensions, and it's heavy — its travel weight is 4.3kg. Another negative is its equally hefty price tag of $8,999.

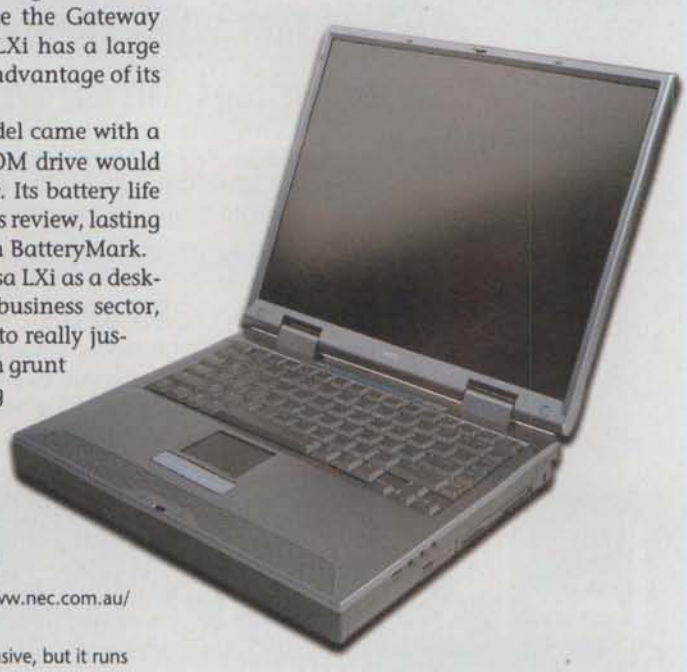
If aesthetics are your thing, then you're in for a disappointment. There's little to admire in this notebook; it's straight, square and fairly unimaginative. And that's about all of its failings.

In the tests, it performed very well; it scored equal first in the Ziff-Davis FPU WinMark 99, but not as high in the CPUmark 99 test. The hard drive, although not the fastest, was quite good in both the Business and High-End Disk WinMark 99 tests, coming third and fourth respectively.

Graphics are a strong point with the Versa LXi. It uses an S3 Savage MX graphics processor and scored highly in the Business Graphics WinMark 99 test, average in the High-End test and left every other notebook choking on its dust in 3D Mark 99 Max. Like the Gateway Solo 9300 XL, the Versa LXi has a large 15.1in TFT screen to take advantage of its graphics processor.

The preproduction model came with a CD-ROM drive; a DVD-ROM drive would have been so much better. Its battery life was the third longest in this review, lasting a respectable four hours in BatteryMark.

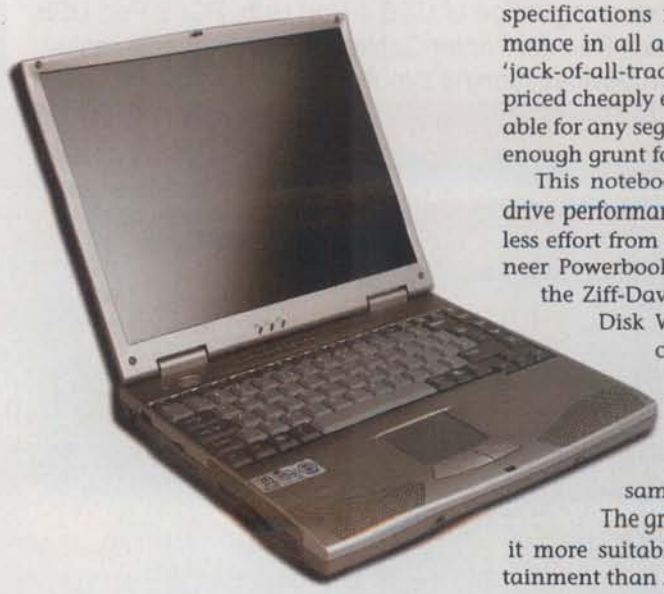
NEC is pitching the Versa LXi as a desktop replacement for the business sector, and it's the first notebook to really justify the label. It has enough grunt to take on any demanding work tasks, and would be just as suitable for home use or gameplay.



Distributor	NEC
Phone	13 16 32
Online	http://www.nec.com.au/
Price	$8,999
In short	It's expensive, but it runs extremely well.

Pioneer Powerbook

Both the Pioneer Powerbook and the IBM ThinkPad 390X came with a 450MHz Pentium III processor and recorded the slowest clock speeds of the range reviewed.



Although the Pioneer had twice the RAM of the IBM, it was not far ahead of it in the Ziff-Davis Business Winstone 99 tests.

Pioneer is aiming this notebook at all segments: corporate, small business and consumer. However, its test results and specifications indicate average performance in all areas. It's a classic case of 'jack-of-all-trades, master of none'. It's priced cheaply enough to be highly palatable for any segment, but it may not have enough grunt for some purposes.

This notebook is marred by its hard drive performance. Aside from the cheerless effort from the Dell Latitude, the Pioneer Powerbook's drive was last in both the Ziff-Davis Business and High-End Disk WinMark 99 by a significant margin. Having a 6.4G hard disk drive is good for a notebook of this price; two of the pricier models have the same capacity.

The graphic performance makes it more suitable for gaming and entertainment than 2D business use. The Business Graphics WinMark 99 score was well below any other notebook, even those with one-third the video RAM, but the High-End Graphics WinMark 99 score was much better. In the 3D Mark 99 Max it scored the lowest of any notebook that could run it, but its performance would still be passable unless it was strained by intensive games. DVD movies looked great, which is a bonus.

Of the seven notebooks reviewed, the Pioneer Powerbook is the best-looking unit of all with its burnished copper colour. The keyboard is large and friendly, and the glidepad is easy to use. It's a rather inexpensive notebook, but in terms of performance, it can't compete.

Distributor	Pioneer Computers
Phone	(02) 9690 2888
Online	http://www.pioneercomputers.com.au/
Price	$4,690
In short	A budget notebook through and through: *not costly, and not a rocket.*



[**eureka** / *ju'rike*: an exclamation of triumph at a discovery]

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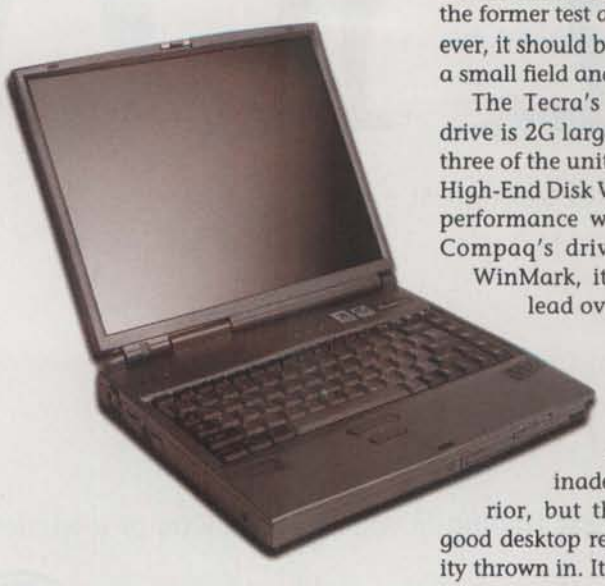
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Toshiba Tecra 8000



The second most expensive model in this review, the Toshiba Tecra 8000 is priced at $8,400, but it packs a decent punch. It did well in both the Ziff-Davis CPUmark 99 and FPU WinMark. Of the four notebooks with a 500MHz processor it placed third in the former test and last in the latter; however, it should be kept in mind that it was a small field and its results were good.

The Tecra's hard drive excelled. Its drive is 2G larger than the 10G drives of three of the units, and faster by far in the High-End Disk WinMark 99. Although its performance was not as strong as the Compaq's drive in the Business Disk WinMark, it still had an impressive lead over the next notebook.

There is a downside to all this grunt; in the Battery Mark 99 test it only lasted two-and-a-half hours. This would be inadequate for the road warrior, but the Tecra would make a good desktop replacement with portability thrown in. It is one of the lighter notebooks reviewed, with a travel weight of just 3.3kg (a kilogram lighter than the NEC Versa LXi).

The Tecra 8000 was the second notebook unable to run 3D Mark Max 99, and it was one of the slowest in the Business and High-End Graphic WinMark 99 tests. Considering it has less than a third of the video RAM of any other unit, the scores aren't too bad. The S-Video connection on the back allows you to use a TV instead of the monitor, and is a handy inclusion. If it came equipped with a DVD-ROM drive (which is optional) rather than a CD-ROM drive, it would be a winner.

Distributor	Toshiba
Phone	1800 021 100
Online	http://www.isd.toshiba.com.au/
Price	$8,400
In short	The Tecra has decent storage and OK performance, but is a little pricey.

Editor's Choice



Compaq Armada M700

Highly Commended
Gateway Solo 9300 XL

The Compaq Armada M700 is a very good notebook. It scored well across the board in all tests. It is one of the more expensive models, but it packs a lot of punch in a slim and light form. Office workers and home enthusiasts could do a lot worse than this notebook. The only real let-down is the battery life; if you travel for long periods between recharges you may find it inadequate.

The Gateway Solo 9300 XL is also a great notebook; it's slim but not as light as the Compaq. Its processor is the fastest on the market, its hard drive is larger than average, it has a huge 15.1in display and it rated well in our tests. To top it off, it is highly affordable.

How we tested

To test the performance of the review notebooks, *APC* Labs reviewed used the Ziff-Davis Winstone 99 and WinBench 99 suite of benchmark software plus 3D Mark 99 Max from Futuremark.

Winstone 99 runs a suite of modern business and graphics applications. These applications are timed to measure how long the notebook takes to complete these tasks. The Business Winstone result is a comparative score of how fast the notebook could complete the various business applications.

WinBench 99 contains a set of subtests, each designed to find out how fast each component of a notebook really is.

Business and High-End Graphics WinMark 99 measures the notebook's graphics performance when performing video tasks associated with common business applications, as well as demanding multimedia and 3D applications.

Business and High-End Disk WinMark 99 provides a measure of how a notebook's hard disk subsystem handles a load equivalent to that demanded by the business applications used in the Business Winstone 99 test.

CPUmark 99 compares how fast the processor, memory and cache subsystem are.

FPU WinMark 99 is a 32-bit floating-point processor test.

3D Mark 99 Max tests 3D acceleration under tests that mimic conditions posed by games and other applications.

Note: All the notebooks tested were shipping versions available to the general public at the time of publication unless otherwise stated. Please note that because of the lead time between testing the machines and publication, some specifications and pricing may have changed. Be sure to check this information with the vendor before purchase.

These tests were performed without independent verification by Ziff-Davis, and Ziff-Davis makes no representation or warranties as to the results. WinBench is a registered trademark of the Ziff-Davis Publishing Company.

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PHOENIX SERIES



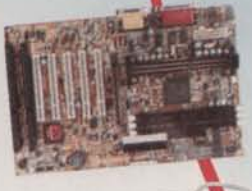
CI-7113 CI-6313 CI-6613 CI-9113



Net PC NLX (LPM) Barebone system

BX chip set all-in-one ATX M/B, slot 1
Builtin VGA, Sound, Lan, USB...
Intel NLX Standard
Dimension (mm): 285x35x85

MICRO STAR Motherboard (Intel, AMD, ATX, MicroATX)





INNOVATION AWARD '99





Intel 440BX/810/k7
D-LED (Self Diagnosis)
Trend Anti Virus safe BIOS
PC Alert
STR
CPU Plug & Play
T.O.P. (over heat protection)
Setting in BIOS for overclocking



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Intelligent S/W monitoring
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Specifications and results: Pentium III notebooks

Product	Compaq Armada M700 (preproduction model)	Dell Latitude CPx H500GT	Gateway Solo 9300 XL (preproduction model)	IBM ThinkPad 390X (preproduction model)	NEC Versa LXi (preproduction model)
Distributor	Compaq	Dell	Gateway	IBM	NEC
Phone number	13 23 93	1800 800 312	1800 500 742	1800 815 154	13 16 32
Online	http://www.compaq.com.au/	http://www.dell.com.au/	www.gw2k.com.au/	http://www.pc.ibm.com/au/	http://www.nec.com.au/
Price	$7,995	$6,087	$6,499	$6,699	$8,999
Warranty	3 years RTB parts and labour	3 years onsite parts and labour	3 years RTB	1 year RTB parts and labour	3 years RTB
Specifications					
Processor	Pentium III 500	Pentium III 500	Pentium III 600	Pentium III 450	Pentium III 500
Secondary cache (K)	256K	256K	256K	256K	256K
RAM and type	128M SDRAM (576M max)	64M SDRAM (512M max)	128M SDRAM (288M max)	64M SDRAM (512M max)	64M SDRAM) (maximum RAM)
Hard disk drive and type	12G	6.4G EIDE	12G Ultra ATA	6.4G EIDE	12G UDMA
Hard disk controller	Intel 82731AB/EB PCI BusMaster	Intel 82731AB/EB PCI BusMaster	Intel 82731AB/EB PCI BusMaster	Intel 82731AB/EB PCI BusMaster	Intel 82731AB/EB PCI BusMaster
Hard disk file system	FAT32	FAT32	FAT32	FAT32	FAT32
Video bus type	AGP	AGP	AGP	AGP	AGP
Video RAM	8M SGRAM	8M SGRAM	8M SGRAM	2.5M integrated VRAM	8M SGRAM
Video controller chip	ATI Mobility Pro	ATI Mobility M1	ATI Mobility Pro	NeoMagic MagicMedia 256AV	S3 Savage MX
Pointer device	Trackpoint	Glidepad and trackpoint	Glidepad	Trackpoint	Glidepad
Dimensions (h by w by d)	2.8 by 31.4 by 24.9cm	4.5 by 31.9 by 25.2cm	4.1 by 32.2 by 26.4cm	4.7 by 31.5 by 26cm	5 by 32.7 by 26.8cm
Bare minimum weight	2.5kg	2.9kg	3.6kg	3.4kg	3.9kg
Travel weight	2.9kg	3.4kg	4kg	3.8kg	4.3kg
PC Card slot type	One type III or two type II	One type III or two type II	One type III or two type II	One type III or two type II	One type III or two type II
Port replicator available	$265	$654	$199	$196	$171
Docking station available	$1,304	$1,122	$499	No	$2,031
CD-ROM drive/DVD	4x DVD-ROM	24x CD-ROM	4x DVD-ROM	24x DVD-ROM	24x CD-ROM
Soundcard	ESS Maestro 2E	ESS Maestro 2E	ESS Maestro 2E	ESS1946S	ESS Maestro 2E
Internal modem (price listed if optional)	56K internal	56k PC Card ($225)	56K internal	56K internal	56K PC Card
Display	14.1in TFT	14.1in XGA	15.1in TFT	14.1in TFT	15.1in TFT
Maximum internal resolution	1,024 by 768	1,024 by 768	1,024 by 768	1,024 by 768	1,024 by 768
Maximum external resolution	1,600 by 1,200	1,600 by 1,200	1,920 by 1,080	1,024 by 768	1,280 by 1,024
Battery type and rated	Lithium ion/	Lithium ion/	Lithium ion/	Lithium ion/	Lithium ion/
battery life	3.5 hours	5.3 hours	4.7 hours	3.7 hours	4 hours
OS available	Windows 95/98 dual boot with Windows NT	Windows 95/98/NT, Linux	Windows 98/NT	Windows 95/98/NT	Windows 95/NT
Expansion slots	Parallel, serial, TV out, CRT, PS/2, audio in/out, USB, IR	Parallel, serial, PS/2, USB, IR, S-Video out, audio in/out	Parallel, serial, 2 x USB, PS/2,IR, S-Video in/out, CRT, audio in/out	Parallel, serial, USB, PS/2, CRT, IR, audio in/out	Parallel, serial, 2 x USB, PS/2, IR, CRT, audio in/out
Carry case included	No	Yes	Yes	No	Yes
Software and accessories	N/A	N/A	Microsoft Works Suite 99, Norton AV, QuickAnswers	PC-Doctor, Norton AntiVirus, and more.	Microsoft Word 2000, Microsoft Works, Microsoft Money, 99 Norton AntiVirus
Benchmark results					
CPUmark 99	47.20	47.30	46.70	43.10	46.60
FPU WinMark Business Disk	2,670.00	2,670.00	2,660.00	2,410.00	2,670.00
High-end Disk WinMark 99	2,720.00	1,480.00	1,960.00	2,330.00	2,000.00
WinMark 99	7,950.00	3,910.00	7,100.00	7,760.00	7,880.00
Business Graphics WinMark 99	153.00	153.00	159.00	146.00	156.00
High-End Graphics WinMark 99	408.00	408.00	451.00	315.00	396.00
Business Winstone 99	20.20	18.40	28.80	20.20	21.90
BatteryMark (battery rundown time)	2 hours and 20 minutes	2 hours and 46 minutes	4 hours and 11 minutes	4 hours and 30 minutes	4 hours
3D Mark 99 Max	1,629	1,593	1,661	Could not run	1,884

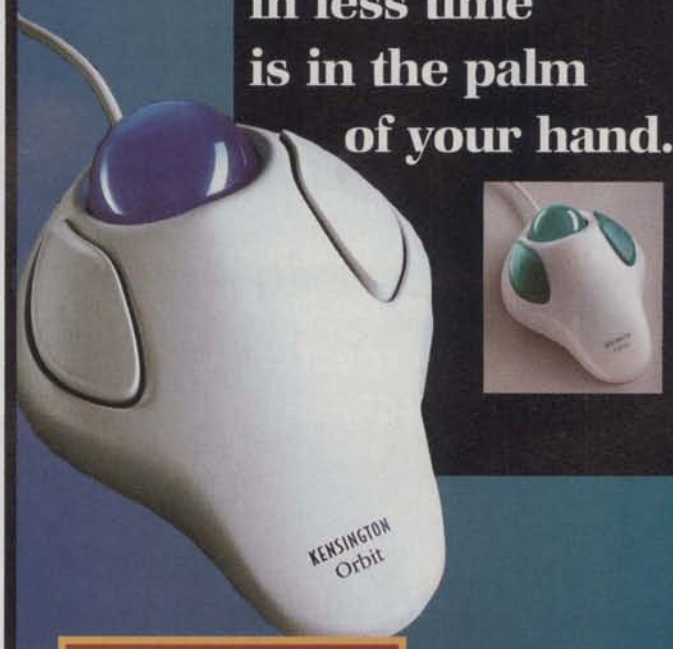
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PIII NOTEBOOKS

	Pioneer Powerbook	Toshiba Tecra 8000
	Pioneer Computers	Toshiba
	(02) 9690 2888	1800 021 100
	http://www .pioneercomputers.com.au/	http://www.isd.toshiba.com.au/
	$4,799	$8,400
	1 year RTB	3 years RTB parts and labour
	Pentium III 450	Pentium III 500
	256K	256K
	64M SDRAM (288M max)	64M SDRAM (256M max)
	6.4G EIDE	14G EIDE
	Intel 82731AB/EB PCI BusMaster	Intel 82731AB/EB PCI BusMaster
	FAT32	FAT32
	AGP	AGP
	8M SGRAM	2.5M integrated VRAM
	ATI Mobility Pro	NeoMagic NM2200
	Glidepad	Trackpoint
	3.9 by 31 by 25.8	4.2 by 31.1 by 25.4cm
	3.3kg	3kg
	3.75kg	3.3kg
	One type III or two type II	One type III or two type II
	$350	Yes (price unavailable)
	No	$1,525
	DVD-ROM	24x CD-ROM
	ESS Maestro 2E	Yamaha OPL3SA3
	56K PC card ($129)	56K internal
	14.1in TFT	14.1in TFT
	1,600 by 1,200	1,024 by 768
	1,600 by 1,200	1,200 by 1,024
	NiMH/	Lithium ion/
	2 to 3 hours	2 hours plus
	Windows 95/98/NT, Linux	Windows 95/98 dual boot, NT
	Parallel, serial, USB, PS/2, IR, CRT, audio in/out	Parallel, serial, PS/2, IR, CRT, S-Video, audio in/out
	No	No
	N/A	N/A
	42.20	46.90
	2,410.00	2,650.00
	1,760.00	2,540.00
	6,020.00	8,010.00
	102.00	150.00
	378.00	333.00
	20.80	20.90
	3 hours and 11 minutes	2 hours and 32 minutes
	1,428	Could not run

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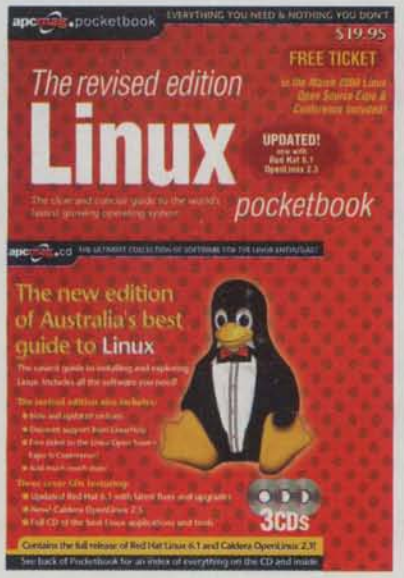


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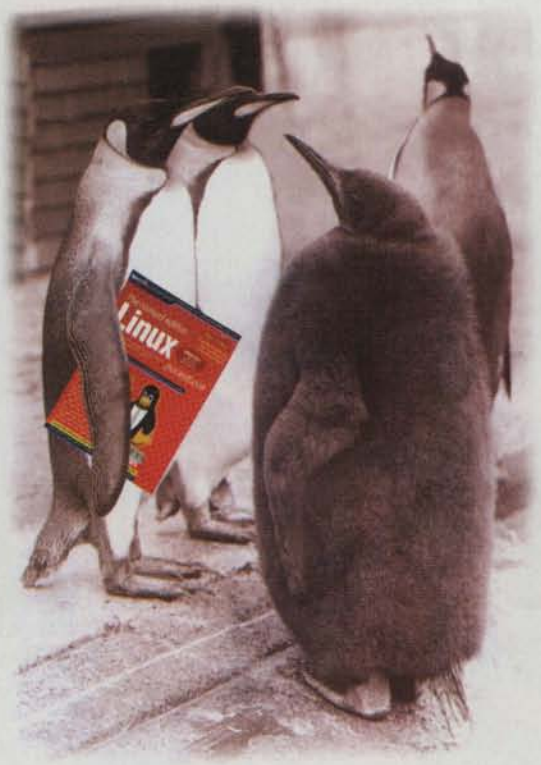
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ALL MAIL REVUE

Email has quickly covered the distance between being a novelty and a business necessity. Should you stick with the software installed with your operating system, browser, office suite or ISP starter kit, or should you look further afield? To help you decide, *APC* tested 11 candidates ranging from free software to big-name commercial packages.

As well as testing the basic features, *APC* particularly looked for a convenient user interface, appropriate support for the automation of routine functions (including message filing, auto-responders and integration with other programs), and innovative and useful features.

Unless otherwise stated, all these programs support HTML (although not all combinations of sender and receiver work properly), LDAP directory services and IMAP mail servers, but they do not support Web-based mail services such as Hotmail. It is expected that that feature will become more widespread, because people are increasingly using Web mail as an adjunct to a regular email account. **By Stephen Withers**

Calypso 3.00.03

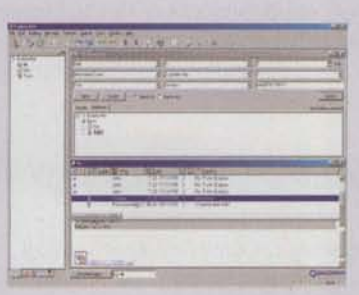
Calypso supports multiple accounts and users with a familiar Windows-style interface. You can control several aspects of the program, such as the ability to minimise to taskbar or tray, choose which address book is used or customise the text used in replies or redirected messages. Calypso makes good use of drag and drop (eg. for filing messages), but the button to create new folders isn't on the default toolbar.

Templates can be used for message text or address lists, and a spellchecker is provided. You can also blind send to a list, so that each recipient only sees their own address in the To field. This can be used in conjunction with the bulk mail capability that reads addresses from ASCII files, although we had problems using it with our mail server.

All your Calypso data can be exported to a single file and then reimported, which is very convenient when changing computers or synchronising email between the home and office. Messages can also be imported from Eudora.

The unconditional auto-response function makes it easy to set up a 'vacation' message. Alternatively, you can set conditional auto-responses as a filter action, plus auto-file, redirect, play a (different) sound, run a program, and so on. Incoming and outgoing messages can be filtered using a good selection of criteria.

Calypso provides plenty of useful features, but the menu hierarchy is a little confusing, the program is a bit fussy about rendering HTML and the package would benefit from improved documentation and help.



Distributor	Micro Computer Systems
Phone	N/A
Online	http://www.mcsdallas.com/mcs/calypso/index.htm
Price	$US24.95
In short	Useful features, but you may need to experiment to get results.

eMail 97 Premier Edition

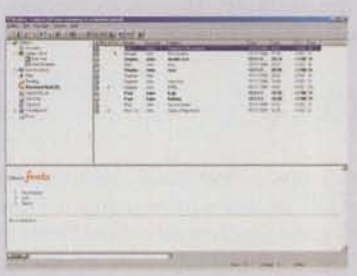
Although eMail 97 was revised recently, it could benefit from a major overhaul. Its appearance seems very flat, and it does not display HTML-formatted email, although its eDelivery feature purports to be compatible with Netscape's Inbox Direct.

Its filtering criteria are run of the mill, but eMail does offer an extensive list of actions, including 'redirect first 100/200/500 characters' and Page Me (though there's no evident support for Australian paging services or GSM Short Message Service). Furthermore, filter rules can be restricted to particular days of the week and hours of the day, but not handy combinations of the two.

The 'eButton' feature lets you create a button to perform a task simply by typing a natural language description, although nothing we tried was recognised apart from simple 'send mail to John' commands. However, it did offer to create a button when we sent several messages to one address. Autocompletion of addresses was surprisingly weak. We had to type in whole names to get the address, even when the first character was unique in the address book.

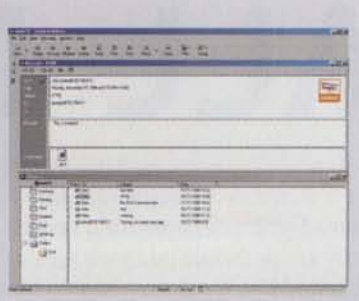
eMail 97 provides its own message encryption and there is provision for PGP in a special version. Being able to add voice annotation can be useful, and add-ons are available for language translation, synchronising and maintaining message folders.

This program is not intuitive to use, and it crashed more often than any of the other email programs we tested.



Distributor	Info-Comtech
Phone	(03) 9756 0055
Online	http://www.e-corp.com/products/email97
Price	$65
In short	Wait for the next major revision.

Eudora Pro Email 4.2.2



One of the few email programs that has attracted a large paying public, Eudora has some excellent features, but is due for a facelift because the multiple-window interface looks cluttered.

The address book provides limited personal information manager (PIM) fields. Data can be imported from Outlook and Netscape, but there's no export facility. Message files can be compacted while the program is running.

On-the-fly spellchecking and address completion both work very well in Eudora. The latter taps a history file of addresses used, as well as the address book, so addresses from deleted messages can still be accessed. You can choose between multiple candidates through a drop-down menu.

Filtering provides the usual actions and will even say the sender's name and/or subject if Microsoft's speech software is installed.

Support for automation means Eudora can exchange information with, and be controlled by, other programs.

Eudora can use IE4 and QuickTime to extend its ability to render HTML and images, as well as its own plug-ins. Basic message templates can be created and multiple accounts are supported.

The Find command is particularly powerful, allowing up to five diverse criteria such as the number of attachments, age, mailbox name and regular expressions (which is a very flexible way of matching text).

Distributor	Lidcam
Phone	(03) 9820 9077
Online	http://www.lidcam.com.au/
Price	$69; 5-pack $259; 25+ user licences $45 per user (academic price $39)
In short	Still setting the pace in some areas, but lagging in others.

Netscape Communicator 4.7



Messenger, Communicator's email module, is a mixed bag. Its strong points include address auto-completion and a built-in spellchecker; address book import and export in comma separated, tab delimited or LDIF formats; provision for signed and encrypted messages; and good filtering. The filters use the usual fields, as well as age in days, message status, and match by is/isn't, contains/doesn't contain, and begins/ends with criteria.

The ability to turn space or comma-delimited text into a table and insert special characters from a soft keypad are useful features, but they won't necessarily be recognised by the receiving program.

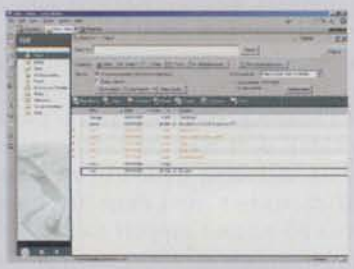
Surprisingly, Messenger doesn't display attached graphics in or near the message. Instead, it provides a link that opens them in Navigator. That's not very stylish, and neither is the help system. Communicator's overall look is cluttered; there are a lot of windows, tabs, tool bars, and so on.

The only way of opening the address book is from the component bar, which floats over all your applications even though shortcuts are installed into the Quick Launch section of the Task Bar. The address book provides a variety of fields, but there didn't appear to be any use for data apart from sending an email.

Unless you are in a community of Messenger users, you'd probably be happier with a different mail program.

Distributor	Netscape
Phone	1800 650 199
Online	http://www.netscape.com.au/
Price	Free download
In short	The good, the bad and the ugly — all in one package.

Notes 5



Notes has a few good features, but is overkill unless you're using a Domino server and working with other Notes users.

One of the most attractive features is message index (including attachments) for faster searching — especially useful for those who hoard messages.

'Agents' provide a level of automation beyond simple filtering. They can be triggered manually, by a schedule, and before or after mail arrives. They can act on all documents, or new and changed ones. Actions include move, copy, delete, reply, send document/message, and run an agent.

Calendar and To Do functions are included, but are most useful for scheduling events with other Notes users.

On the downside, it allows you to format text in ways that are not supported by other mail clients (eg. shadow), but it doesn't provide a font menu.

Notes also uses unusual terminology and actions. For example, exchanging mail with a server is achieved through the File/Replication/Replicate command. You need to press F9 to refresh the inbox when mail arrives. It also doesn't automatically display attached graphics; you must right-click to open a separate window.

Distributor	Lotus
Phone	1800 252 408
Online	http://www.lotus.com/home.nsf/tabs/australia/
Price	$215
In short	Good for Domino users.

RE-SELLER ENQUIRIES WELCOME

CheckMARK technologies PTY LTD

Lost&Found



Your data is priceless. Whether it be the last five years of your financial records or Grandma Brown's favourite recipes, if anything happens to them - like deletion, virus infection, hardware failure - replacement would be difficult or even impossible. Fortunately, with Lost & Found restoring lost data is just a few keystrokes away. Rather than spending thousands of dollars to send your hard drive to a data recovery centre, Lost & Found lets you automatically recover and restore data after accidental (or even intentional) data loss, or from corrupted media caused by a disk crash or logical system failure. Our patent-pending technology will even recover data if the partition has been reformatted or if the FAT tables have been destroyed! In fact, as long as your disk is still spinning, Lost & Found can locate and recover almost any file, anywhere on your disk.

$99-95 RRP

ServerMagic

Upgrading your server can be a long, tedious process even for the most experienced network professional. Worst of all, backing up and restoring the data on your hard drive means that your network may be down for hours or even days. Fortunately, now there's ServerMagic from PowerQuest. As the only network management tool with the power to safely and painlessly upgrade your hard drive and expand your server's partitions on the fly, ServerMagic will save you time, money and frustration.

ServerMagic runs as an NLM, compatible with NetWare-related drivers and server technology, including SCSI and IDE drive support. Functions with mirroring, duplexing and RAID systems.



1 SERVER $720 RRP

DriveCopy



Is the safest, easiest and most affordable way to copy everything form your old drive to your new drive. When using DriveCopy there is no need to back up your old hard drive, reinstall applications, format and repartition, as all these steps are done for you quickly, easily and effortlessly.

DriveCopy copies multiple partitions and expands them proportionally on your new disk. It is an easy-to-use utility for copying the contents of one hard drive to another.

$44-95 RRP

Drive Image Pro



Professional is the fastest and most flexible way to clone workstations. Using patent pending "smart sector" technology (which copies only full sectors), you can quickly and easily create a compressed image file of an entire hard drive or individual partitions of a hard drive. This image can be stored on a network or other storage device and then downloaded to instantly set up new workstations, saving hours of installation time and expense.

10 USERS $35 PER USER RRP

PartitionMagic



PartitionMagic allows you to optimise your hard drive without destroying data. It is as easy as clicking your mouse. Now even novice computer users can visually create, format, shrink, expand and move hard-disk partitions in minutes. Placing your data files in a separate partition makes it much easier and faster to perform regular back-ups. Also by installing operating systems in separate partitions, you can easily migrate to Windows 95/98/NT/2000, OS/2 or Linux without burning your bridges.

$99-95 RRP

Drive Image

Is the complete hard-drive imaging solution for hard-drive back-ups, upgrades, and data recovery. Drive Image lets you easily create a compressed image file of an individual partition or an entire hard drive. This file can be stored on a network, JAZ, ZIP, CD-ROM, or tape drive and then downloaded to make quick work of backups, disaster recovery, or upgrading to a new, larger capacity hard drive. With Drive Image, image files can be downloaded to drives of the same size or resized to fit drives of a different size and geometry for maximum flexibility.

$99-95 RRP

MACADMINISTRATOR

MacAdministrator is a unique and complete Mac lab administration program. It provides control, protection, automatic distribution and Internet management. It provides centralised document storage and "virtual desktops", allowing a user to log onto any machine on the network and only see their personal desktop and folder set. MacAdministrator provides detailed reporting of usage, auditing of software, remote application installation and automatic distribution of upgrades and printer management.

10 USERS $88-00 PER USER RRP

NetOp



NetOp is a help desk and network management tool designed to give easy remote access to any machine on a LAN or WAN for technical support, training and demonstrations, server control and remote diagnostics. NetOp has multi-level password security, broadcasting, and control of up to 10 machines simultaneously.

1 x GUEST + 1 x HOST $265-00 RRP

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Outlook 2000



Outlook is more than just a mail program; it also handles contacts, tasks and calendars. These functions are well integrated both internally and externally, so you can schedule appointments with other users via email or write a letter to a contact using Word. It is also capable of automatically adding entries to the contacts database when you reply to messages, and you can view relevant messages when looking at a contact's record. If Microsoft Office is installed, and it probably will be if you're using Outlook, its spellchecker is automatically used.

The use of a wizard to prepare filters is particularly helpful to beginners, and it is not too cumbersome for experienced users unless they amend filters frequently. As the help doesn't really give an adequate explanation of how to use filters, they will probably be underused. To offset that, it is a quick and easy task to add to the junk senders or adult content lists when viewing a message in those categories.

Message templates are available, but only for the general style, unless you use Word as the editor and create templates in that program. Multiple users are supported via Windows user login, and the S/MIME standard is used for secure messages.

Outlook does the job, but is unexciting and its popularity and macro capabilities make it a target for virus writers. People not using the non-mail parts may find it cluttered and should consider Outlook Express instead.

Distributor	Microsoft
Phone	(02) 9870 2200
Online	http://www.microsoft.com.au/
Price	$189
In short	Useful PIM integration, but keep your virus scanner up to date.

Outlook Express 5.0



Like Outlook 2000, Outlook Express provides an easy, Wizard-driven setup. It supports multiple users through Windows login, and multiple identities or accounts for each user. A big plus is that it can use Hotmail accounts as well as regular mail servers.

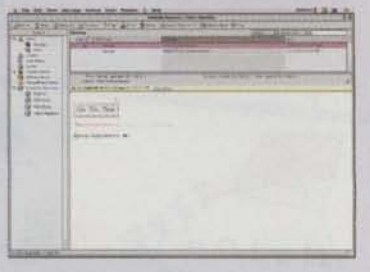
Support for several public directories (eg. Yahoo People Search and Bigfoot) is provided, and others can be added. Despite being a 'lite' edition, it includes spellchecking, stationery (like Outlook), support for multiple signatures, certificates, and message cleanup within the program. It's even possible to log transactions with servers to help trace problems.

The ability to have different views of a folder (eg. hiding messages that have been read) is convenient, for example, when catching up on mail, and is an adjunct to filtering. If you subscribe to more than a couple of mailing lists, you'll probably want to have at least some lists' messages automatically filed. Being able to build filtering rules based on the current message helps this task. Although there is a blocked senders list — either individual addresses or whole domains — the program doesn't really block messages, it just moves them straight into the Deleted Items folder.

If you simply want email and news, this is a very attractive program.

Distributor	Microsoft
Phone	(02) 9870 2200
Online	http://www.microsoft.com.au/
Price	Free
In short	Most users need look no further.

Outlook Express 5.0 for Mac OS



Outlook Express was a dream to install. A 'test drive' setting preserves your current email setup — among other things, it leaves mail on the server so your regular program can still collect it. Hotmail support is a feature, just as it is in the Windows version.

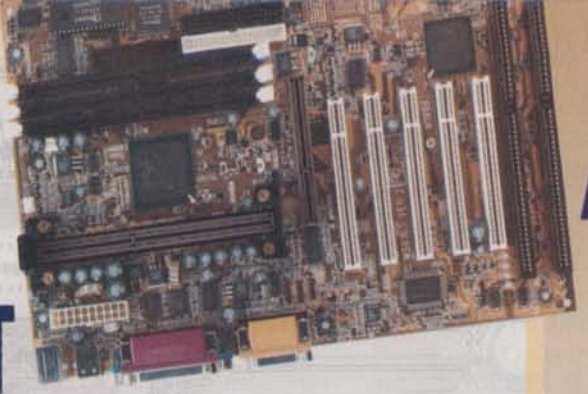
The user interface is quite tidy and easy to use, but it has a slightly odd appearance. Filtering is well implemented; there are plenty of criteria and actions. For example, you can use it to reduce the priority of an outgoing message if it has any attachments. Filters can even trigger an AppleScript. Outlook Express is scriptable, and has a Scripts menu populated with samples. For further automation, events can be scheduled to occur on launch, quit, at a particular time, at intervals or on demand.

You can control the aggressiveness of the junk mail filter, but you may not want a program to decide which messages should be deleted.

Apart from storing email addresses, the address book can mailmerge with Word and synchronise with a Palm. Spellchecking is available if Office 98 is installed. Multiple identities and accounts (including Hotmail) can be used. Other convenient features include displaying the selected signature on outgoing mail, and a mailing list manager.

Distributor	Microsoft
Phone	(02) 9870 2200
Online	http://www.microsoft.com.au/
Price	Free
In short	Even better than the Windows version.

Fast. Flexible. Reliable



THE BEST MAIN BOARD OF '99

MS-6163 ATX BX MOTHERBOARD

"The MS-6163 support 15 different FSB setting, from 66 to an impressive 153MHz. You also get multiplier settings from 3X to 8X at 0.5X multiples. Even though Intel is now locking down the multiplier setting on its chips, You can still manipulate the FSB to squeeze more speed out of it, and this board is ideal. What makes this board even better is that is also allows you to adjust the core voltage from within the BIOS. It also supports an on screen display of CPU and system temperature as well as fan RPM speeds ... Everything on the board is well located ..."

Nov '99 Australian PC User

"When it comes to motherboards with flexibility, the MSI MS-6163 is truly a work of art"

Micro-Star International is the most reputable motherboard in China's DIY market

From the survey conducted by the "China Computerworld" magazine in July, Micro-Star International has dominated the DIY (Do It Your Self) market in China. Furthermore, Micro-Star International defeated other competitors and became the No. 1 brand in China's DIY computer market again from the last survey conducted by the "Micro Computer DIY" magazine in October.

The objective of the survey is to determine the most popular and the No. 1 chosen brand when consumers purchase their computer products.

The excellent product quality and service made Micro-Star International the No.1 motherboard manufacturer in the consumer's mind. Together with the outstanding results among the pricing and product ratings, there is no doubt about Micro-Star's distinguished brand position as the No.1 motherboard in China's DIY market.

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OUTSTANDING AWARDS

1999 Innovation Award
Overclock.
digiweb's France

Editor's Choice
Computer Paper March '99
China.

Editor's Choice
RunIPC
Magazine
Feb '99
Taiwan.

"One of the best BX boards out in the market".
ComputingPros

"The happy quartet of LEDS all shining brightly "

"Best Motherboard".
PC USER Aug. '99

"Product of the Year".
PC USER Nov. '99

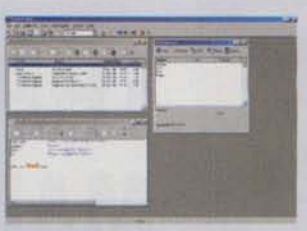
"reached 98 points on a possibility of 100".

Overclocker's *Paradise*
GameStar computer magazine April '99
Germany.

"The Five Star Award".
Hardwarezone.com April '99

"High score in the Slot 1 ATX category".
PC Intern June '99

Pegasus Mail 3.11



Pegasus Mail has a long and respected history, and is an excellent example of free software. Like most word processors, Pegasus can perform a mailmerge to send personalised messages to several people. This works well, but is slightly cumbersome as the message template must be created outside the program and address book entries must be exported to a text file before they can be used. Despite that, it is a very worthwhile feature.

Circulation messages are another good idea, allowing a message to be passed around a chain of people for comment. It does not rely on Pegasus, but if anyone in the chain is using a different mail program it is easy for them to lose the remaining addresses even if they try to follow the attached instructions.

Filtering is particularly powerful. The filters can be applied to message folders when they are opened or closed, or you can filter one folder at a time. The extensive criteria include match headers, data, age and regular expressions. Complex sets of filters can be constructed, as flow of control statements include if/then, call/return, goto. Pegasus can even be used as a list server.

Address completion works well, multiple users are supported and an add-on module lets you check multiple POP3 mailboxes. The biggest weakness is that Pegasus uses your browser to display HTML-formatted messages.

The full benefits of Pegasus Mail only come if you belong to a Pegasus-using community, but it is a good package.

Distributor Pegasus
Phone N/A
Online http://www.pegasus.usa.com/
Price Free
In short Some good features and mailmerge is a standout.

Poco 1.2



If you like software with a bright interface, try Poco. It may be too colourful, but has a clean appearance with plenty of steak behind the sizzle.

The built-in scripting language gives flexibility for filtering and automation, but there is a lot to learn. Automation features include spellchecking, mailbox backup, and scanning incoming files for viruses with your existing antivirus software.

A feature that should be widely implemented is the ability to look at messages waiting at the server and then decide to get, leave or delete them. Poco also lets you set up a junk filter based on the message you're looking at.

A 'privacy sheet' hides Poco's window when you press Shift-F12. *APC* also appreciated the font samples alongside the Font menu, and the use of a second click on the close box when abandoning a message.

Poco also displays the signature it's going to attach to an outgoing message. Messages can be forwarded by dropping them into the address list, and templates can be used to create new outbound mail or to prepare replies.

Multiple accounts are supported, and mailboxes can be imported from or exported to Netscape, Eudora and RFC822 format files. Address books can be copied from or to CSV or LDIF files.

Distributor Slaven Radic
Phone N/A
Online http://www.pocomail.com/poco/
Price $US25
In short Good things come in small packages.

The Bat 1.36



Despite being one of the smaller programs tested (it has a 1.5M installer), the Bat packs a fair punch. A 'type anywhere' editor allows for easy formatting — just click and type. Templates can be used for new messages, replies, forwarding and reading confirmation, and templates can be associated with the address book entries.

The spellchecker works in the background, but its ability to make replacements to enforce style or as shorthand only kick in when a message is explicitly spellchecked. It can utilise Microsoft's CSAPI, but failed when we selected Office's Australian English dictionary.

Extensive filtering options mean the Bat can be used as a list server. Most filters work by matching strings in sender, message body, subject and so on. New filters can be based on existing messages. Kill filters examine the originator, subject and routing as an antispam device.

A wizard simplifies importing messages and address books in many formats. Folder management, including purge and compress, is built in. Better HTML support is needed. The Mail Ticker provides a floating, scrolling display of unread messages, but takes up a lot of room.

SOHO users may benefit from the server mode that lets one copy of the Bat act as a mail gateway.

Distributor RIT Research Labs
Phone N/A
Online http://www.ritlabs.com/the_bat/index.html
Price $US35/45 (individual/business); $US25 (academic)
In short High-power templates and filtering.

Editor's Choice

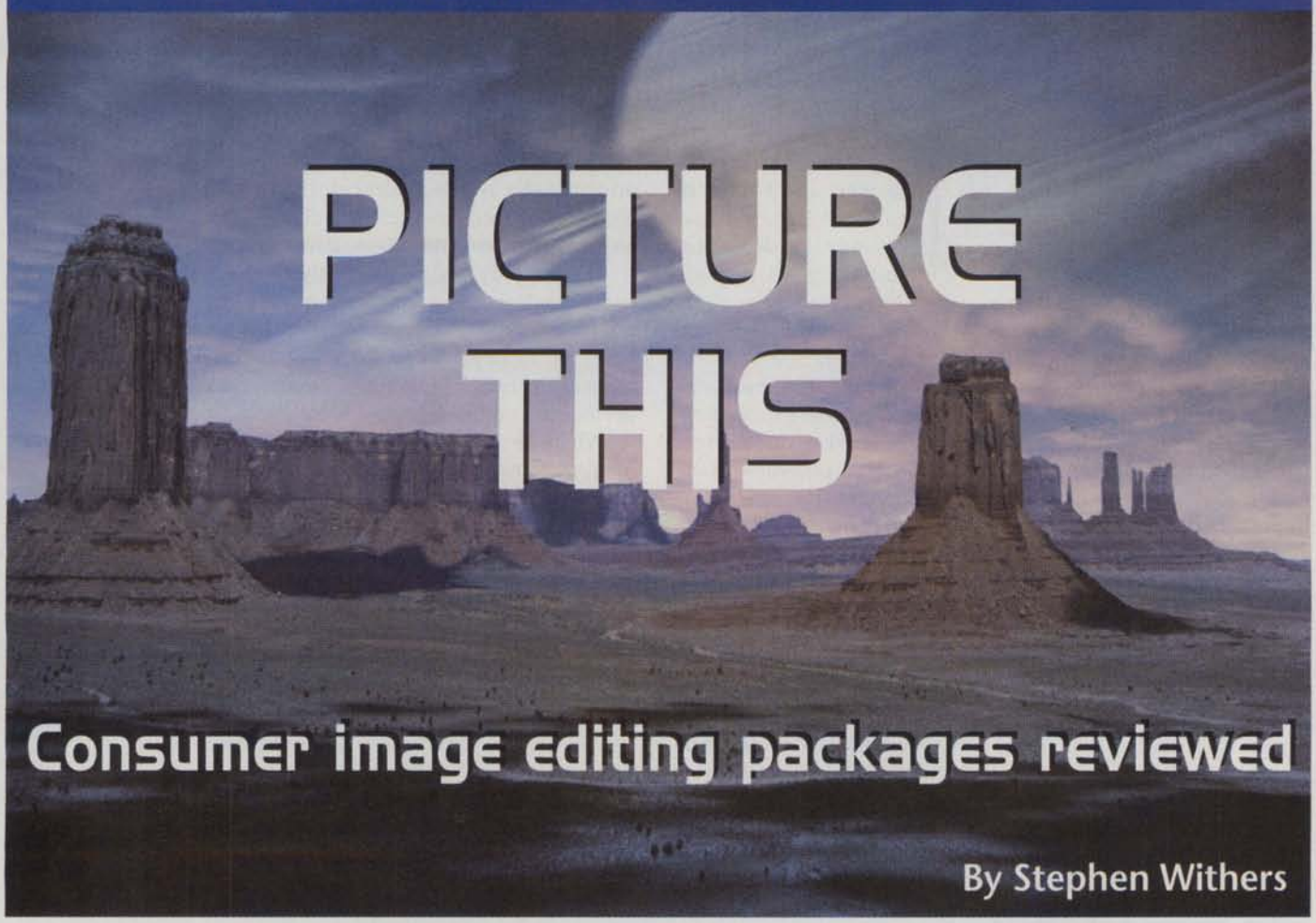


Microsoft Outlook Express 5.0 (Windows and Mac OS)

Highly commended
Pegasus Mail 3.11, The Bat

One of the big attractions of Outlook Express is that it does the job and no more. Although integration between email and PIM software is important for some power users, *APC* isn't convinced that both jobs should be done by one piece of software, because this can make things complex for those with more basic needs.

IMAGE EDITORS



PICTURE THIS

Consumer image editing packages reviewed

By Stephen Withers

The proliferation of digital cameras and scanners has made digital images more common than ever. But which is the best package to manipulate and enhance them? *APC* reviews seven top image editors that'll do the job without breaking the bank.

Digital cameras are becoming more common, but they are still quite expensive. Scanners, on the other hand, are almost being given away compared with their prices five years ago. There's a fair choice around the $200 price point, and we've even seen them marked down to $99 in a sale. If you are on an even tighter budget and you've just got one or two rolls of film from a special occasion that you want digitised, photo shops will get the job done for you at less than $15 a roll. If you are happy with the idea of using other people's photos, stock photography is cheaper than ever and there is a handy selection in most of the CD-ROM-based graphics collections from companies such as Corel. All this means that the long-awaited boom in domestic digital image applications seems to have begun. Most home computers purchased in the last couple of years are up to the job, as are inkjet printers of similar vintage.

There are many different uses for digital images, from T-shirts and coffee mugs, CD labels and Web pages, to family trees and greetings cards. Similarly, there is a wide variety of software available for these applications. Whatever you plan to do with your images, they will probably need some editing first. These editing tasks could be simple cropping, hiding the plant that seems to be growing out of Uncle Jim's head, constructing elaborate photomontages, or special effects such as cartoon-like deformations of chins, noses and ears. Common editing tasks include the removal of flash-induced red-eye or marks caused by scratches or dust, and the addition of vignettes and other framing effects.

In many cases, the software in this review is sold as part of a suite or comes bundled with imaging hardware. *APC*'s tests will help you decide whether you should stick with what you've got, or if it is worth shelling out for another program.

APC is giving away five copies of Adobe PhotoDeluxe Home Edition 4.0. See **apcmag.cd** for details.

apcmag.labs



Adobe PhotoDeluxe Home Edition 3.0

PhotoDeluxe needs 140 Megabytes for a full installation, but only a little over 50M if Adobe Type Manager, Acrobat Reader, and Microsoft Internet Explorer are already loaded. The installer plays a quick AVI introduction, a good idea that is well implemented. It has enough detail to get you interested, and is not so long that it becomes boring.

The software provides two modes of operation: normal and advanced. The former guides the user through different activities, and the latter includes the full set of menus. This is a viable alternative to Corel's approach of keeping the menus accessible at all times and it has the option of onscreen guidance.

PhotoDeluxe simplifies the task of getting images into the computer from a scanner or digital camera, but a preview thumbnail is not always displayed when opening an existing file. The EasyPhoto module provides a visual index.

Tracing around the edge of an object is computer-assisted but there isn't a way of making fine adjustments to the outline. Red-eye removal works well, and there are the usual tools for cleaning up dust, scratches, and so on. Retouch Face is a bit different; if you can't afford cosmetic surgery, you can look younger in your photos by using this tool to remove bags under the eyes, wrinkles and other blemishes. It takes a little practice to pick exactly the right source points to get a smooth blend of skin tones, but it isn't difficult. Another very good feature is the inclusion of Extensis' InteliFix tool, which automatically adjusts the overall picture quality.

There is a broad selection of effects, and the coloured pencil and vignette worked particularly well. The tools for getting old fashioned sepia or hand-tinted effects are also good, although we do need more practice (see screenshot).

There is only one undo, but that's not as much of a problem as it sounds, because you are applying effects to the whole picture or areas within it, rather than working at the pixel level. However, there are times when the program leads you to apply a sequence of two or more filters. In such cases, you can't return to the starting point.

When the job is done, PhotoDeluxe will export to an assortment of formats, or you can use the image in a variety of projects such as greeting cards, calendars, picture frames or slideshows.

Distributor	Adobe
Phone	(02) 9778 4100
Online	http://www.pacific.adobe.com/
Price	$129
In short	Produces good results, is relatively inexpensive and has a lot of features. *APC*'s Editor's Choice.



Corel Photo House 5

The first time *APC* saw Corel's 'Notebook' interface, we weren't convinced it was worth the space it takes up on the screen. However, we have come to appreciate it now that 17in monitors are more common. It augments the normal menus and toolbars with a context-sensitive list of choices that are task focused. For example, if no document is open, the Notebook suggests opening a file, starting a new document, opening a file from the catalog of content provided with the software (possibly augmented by the user), scanning a picture or downloading an image from a digital camera. When you open a file, the choices change to include editing and printing. This approach is good for beginners and can be quickly turned on or off, which is convenient for more advanced users.

Photo House provides useful filters such as red-eye, scratch and dust removal, and vignette, plus fun stuff including colour replacement, and 'artistic' effects like page curl.

One addition *APC* would really like to see is 'handles' on rectangular cropping areas so the selection can be resized. It was difficult to hit the exact area first time, and the fine adjustment allowed by Photoshop was missing. A good feature is that multiple overlapping areas can be selected, so it is relatively simple to crop to a T or L shape. Other manual editing tools include the usual brushes, spraycans and erasers. Features once considered advanced but now found in low-end *software* include cloning and image spraying. Its 10 undo levels are enough to allow you to recover from most mistakes, and more levels can be selected subject to available memory.

'Optimise for Internet' allows you to save images in JPEG, GIF or PNG formats, and it has a useful preview mode that shows the effect of increasing the compression or reducing the number of colours. Photo House supports a variety of other formats, including Photoshop, FlashPix and Wavelet Compressed Bitmap.

Support for a good range of digital cameras is provided, but *APC* was surprised to find that Photo House required 66M of disk space with just one camera selected. It turned out that this was quite modest. Another issue is that when a CD-ROM other than the one currently in the drive is needed, the program tells you it's the wrong disc, but doesn't identify which one it wants.

Distributor	Corel
Phone	1800 658 850
Online	http://www.corel.com/
Price	Part of Custom Photo Special Edition (price not yet available) and Print Office 2000 ($149)
In short	Provides a useful toolset without hindering the user.



Corel Photo-Paint 9

Photo-Paint is a relatively high-end program, but it's included here bescause it is with the widely used CorelDraw and it has a reasonable crossgrade price. It requires about 125M of disk space, depending on the options selected and whether any components are already present as a result of installing other Corel programs.

The artistic effects such as crayon or watercolour worked well on the photos we tried, certainly better than PhotoDraw's. There is also a wide range of other effects, including simulated weather. The rain effect was more convincing than snow, especially when the setting was closer to drizzle than downpour. The texture maps could also be useful. For instance, the result of applying the brick wall texture to a photograph is just as you would imagine a photorealistic painting on the side of a building to look. The effects are interactive in that you can adjust the parameters, either by retyping or by nudging with the arrow keys, and see the result. Dust and scratches can be removed automatically, but there is no red-eye filter. The Checkpoint feature is very useful, as it gives a quick and easy way of capturing a particular stage in a job and returning to it if things don't work out right. The image sprayer produces interesting results; the preset rope patterns provide an idea of how this feature could be used.

Pantone and other colour palettes are supported, as is input from TWAIN scanners and cameras. CorelScript and VBA make it possible to automate operations, which is useful if you need to perform the same operations on a set of images. You can record CorelScripts, making it easier to get started.

A very wide range of file formats is supported, including Wavelet and Photoshop. For Internet use, there's GIF, PNG and JPEG.

Photo-Paint doesn't lead you by the hand, but *APC* found it produced some of the most attractive results of all programs reviewed. The tutorial is flawed, because the terminology it uses doesn't seem to match that in the tool tips. Part of the problem is that each flyout's icon represents its currently selected item, so to be most effective, the tutorial system would need to be able to interrogate the state of the flyouts to prompt the user appropriately. The good news is that there is a proper manual. Call us old-fashioned, but *APC* has yet to see the online help system match a good manual.

Distributor	Corel
Phone	1800 658 850
Online	http://www.corel.com/
Price	$799 ($249 crossgrade)
In short	Very flexible — more suited to the adventurous than the beginner.



Jasc Paint Shop Pro 6

Paint Shop Pro only requires about 52M of disk space if you don't install Animation Shop (a separate program for creating animations for Web sites and presentations), plus 6M to 8M for direct support of digital cameras. The program also interfaces with cameras and scanners via TWAIN.

It can read more than 40 formats and write over 30, including the usual favourites and some from other platforms. It's almost worth using just as a graphics translator and screen capture utility.

The browse function is very convenient when opening files. It provides a Windows Explorer-style window, displaying thumbnails of all image files in the currently selected folder. When you find the right one, just double-click to open it.

The tool for tracing around an object lacks provision for touching up the line, but seemed to work better than PhotoDeluxe's equivalent. Paint Shop Pro is one of the easiest programs for building a composite image by pasting an object cut from one image onto another background. Text and other vector graphic objects can be applied to different layers, making it easier to manipulate an image.

Paint Shop Pro provides an interesting range of effects (such as artistic media and textures) and distortions (eg. skew and ripples). You can explore effect parameters, but we found it hard to match the quality of the quick and easy results of Photo-Paint. Unlimited undo/redo steps encourage experimentation.

The user interface has some flexibility. To change a vector object's colour and line width, you can either double-click on the object to open its Properties dialog or select Properties from the context menu. It would be better if choices made in the colour palette were applied directly to the selected object, but the Properties dialog still has some useful features. Changes made are immediately reflected in the picture, and the pop-up slider for controlling line width is handy. A miniature thermometer-style display immediately under the line-width field indicates the current width, relative to the maximum and minimum values.

The manual is well written and presented, but its index could be improved. *APC* had problems picking the right term to find the material we wanted. The online help system uses unusual tab icons to represent the index (a key) and search facilities (binoculars). Don't overlook them when you are hunting for information.

Distributor	Communique Software
Phone	(02) 9622 5624
Online	http://www.comm-unique.com.au/
Price	$199
In short	A good value-for-money program, but not for tricking up happy snaps.



Microsoft PhotoDraw 2000

PhotoDraw occupies a hefty 150M of disk space, and there's not much you can leave out when installing. As its name suggests, PhotoDraw is both an image editing and drawing program.

It has a good range of border or frame effects, such as the 'paper clip' edge seen here in the screen dump. Note that the border picks up the colours of the image, which usually gives a pleasing result. The only real problem comes when the border reverses out a white pattern, and the edge of the picture is also white. This could happen with indoor shots, if there is a white building or snow in the background, or even when the photo is taken on an overcast day.

There is also a wide range of other effects, including artistic textures (watercolour, craquelure, and so on), but many seemed too coarse to be particularly useful when applied to an entire photo. Interesting images can be obtained by copying an object from a picture, applying an effect to the remainder, then pasting the unchanged object back into place. Many of the photographs included with the product have had their backgrounds removed to simplify the assembly of composite images. You might create a background with the drawing tools, add a photographic object and then apply a shadow effect. Although you can control the shadow's sharpness and translucency, the overall effect is less than stunning. *APC* noticed that shadows do not appear to 'grow' from the places where the object would be in contact with the surface (such as the soles and heels of a person's feet).

A useful variety of crop masks are provided, varying from simple geometric shapes to silhouettes of animals and human-made objects. They can also be used to punch out part of an image, and that area can be placed in a new picture. Selecting areas by colour or by following edges works reasonably well. The ususal tools for cleaning up photos, such as red-eye and scratch removal, are provided. Scanners and digital cameras are supported via TWAIN to get photos into the computer.

A good variety of file formats are supported, including GIF, JPEG and PNG for use on the Web. The 'Web safe' colour palette is built into the program. The package also includes a selection of templates for Web banners and buttons, plus business stationery, greeting cards and a collection of editable 'designer clip art' which is more useful than it sounds for dressing up images.

Phone	13 20 58
Online	http://www.microsoft.com.au/
Price	$199 (also included in some versions of Office 2000)
In short	Plenty of functions. Office users will feel right at home.



Ulead Photo Express

This program takes up a hefty 140M of disk space, but it provides plenty of photo-based activities.

Images can be imported into the program from scanners, cameras and video capture cards as well as disk or CD-ROM files. 'Auto enhance' gave very pleasing results with the pictures *APC* used, bringing out details hidden in shadows but preserving good colour in well-lit areas. There are the standard tools for cleaning up photos, including trim (to size or to a variety of shapes), resize, scratch, dust and red-eye removal. Red-eye removal worked very well, once the parameters were adjusted to suit the particular shade of red in the photo.

Smart Select follows the line quite well while you're tracing around the object, but the result is rather jagged unless there's a good contrast between the object and its background. Unless the background is fairly plain, it's not always easy to isolate an object with this technique or by painting with a colour replacement brush, but the latter did the job on some images.

Clip art and backgrounds, as well as extensive range of text and graphics effects, come with Photo Express. The program uses drag and drop to apply adjustments and so on, which quickly becomes a natural way of working.

Like the other programs with frame effects, Photo Express places the frame inside the boundary of the current image. It would be better to give users the option of rescaling the image so that the whole picture fits inside the frame, which then fits in a standard photo size.

Flexible printing options include single images, multiple copies of the same image on one sheet, copies of multiple images on the same sheet, poster-size images over multiple sheets, and a preset for iron-on transfers.

A slim yet friendly manual and a multimedia tutorial quickly get you up and running. An extensive range of customisable projects includes greeting cards, calendars, cut-and-fold framed photos, bogus movie posters and magazine covers, and screensavers. Web cards and albums round out the package. Generally speaking, the program is very straightforward and effective: you pick a template, drop in your photo(s), and then customise other design elements such as the text. A separate program constructs 360° panoramas from a set of photos.

Distributor	Lakovision
Phone	(03) 9852 7444
Online	http://www.lakovision.com.au/
Price	$99
In short	Should be on everyone's shortlist.



Ulead PhotoImpact 5

Setting a record by requiring a disk-gobbling 225M of disk space (excluding the sample files), PhotoImpact is suitable for high-end home use but is really aimed at the business market.

All of its effects, filters and libraries appear in a single floating palette which has either an Explorer-like interface or a tabbed view; it's a very clean and convenient approach. The Visual Open command lets you browse thumbnail previews of files, and when you know you only need to touch up a small area of a very large file, the partial load feature lets you save time and work on just that portion.

PhotoImpact opens over 30 file formats and saves in 13. Scanners and cameras are supported via TWAIN, and the software provides for post-processing such as straighten, brightness and contrast, and despeckle. The program can also stitch two images together.

A good range of filters is provided, including geometric and natural media effects. The charcoal filter caan be used either in monochrome or for a coloured pencil effect.

The snap to edges option on the lasso tool works quite well. Although it is one of the best for selecting individual objects from a photo, it's not up to the standard of expensive professional software. Once again, there's no way to adjust the finished selection, but at least you can erase the selection line back to successive points where you clicked the mouse button and try again. This feature is worthwhile, as are the 99 levels of undo and redo.

Macros are easily recorded to automate repetitive tasks. Macros are implemented within the Quick Access Panel, which can also be customised with the commands you use most often.

The red-eye removal feature works well, but on the picture *APC* found it necessary to constrain the area quite tightly around the pupils in our baby photo (see screenshot), otherwise red areas elsewhere on the baby's face were affected. The program lets you work on one or two eyes at a time, which is helpful.

The PDF manual included on the CD-ROM was quite good, but the online help was not always helpful. In particular, the descriptions of the commands don't specify where the commands are located (in which menu, or which button in which toolbar).

PhotoImpact also includes extensive Web features including image optimisation and slicing, GIF animation (through a separate program), and a Java rollover assistant.

Distributor	Lakovision
Phone	(03) 9852 7444
Online	http://www.lakovision.com.au/
Price	$199
In short	Especially good for automatically performing the same operations on multiple images.

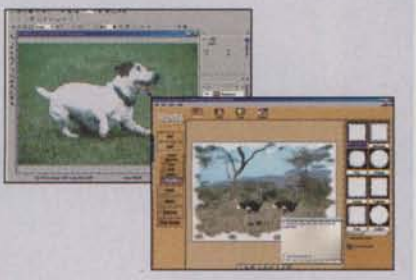
Editor's Choice

Adobe PhotoDeluxe Home Edition 3.0



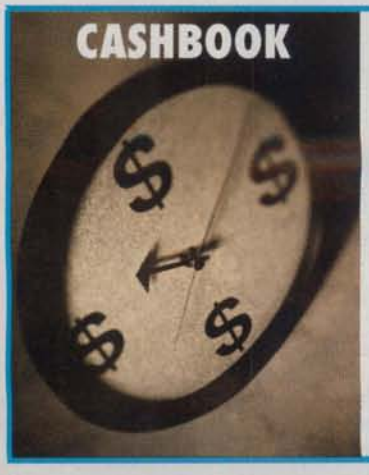
Highly commended

Corel Photo-Paint 9.0 and Ulead PhotoImpact 5



Choosing one program from this field wasn't easy, but PhotoDeluxe won because it provides good results with minimum effort.

The two highly commended programs are more expensive and both require more work on the user's part to get good results. Photo-Paint delivered the best natural media and texturing effects *APC* saw during testing. PhotoImpact falls short of Photo-Paint in this area, but makes up for it with its strong Web-oriented features and the ease of automating repetitive activities.



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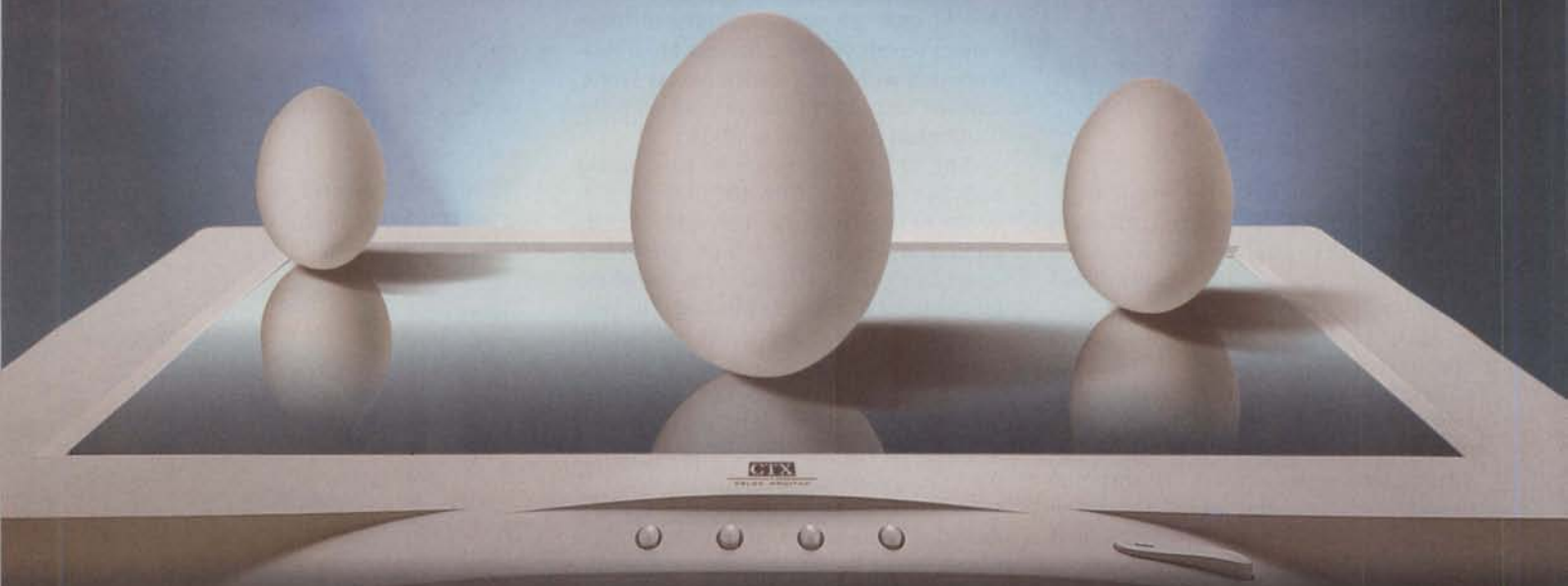
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Workshop

Welcome to Workshop. This section is dedicated to bringing you all manner of tips, interesting information and do-it-yourself tutorials. Within these pages you will find useful shareware, informative operating system-specific columns and in-depth programming tutorials.

All files mentioned in Workshop can be found on **apcmag.cd** or downloaded from our Web site at http://apcmag.com/. You can join one of our online discussion forums to discuss technical issues or to voice your opinion on any related topic.

Workshop is a reader-input section. Please send us your ideas, comments or criticisms via email to workshop@acp.com.au, or snail mail to *APC* Workshop, PO Box 4088, Sydney NSW 1028.

A full archive of Workshop articles can be found online at http://apcmag.com/workshop/.

Andrew Colley, Workshop coordinator

Tech Talk

Technobabble visits a fundamental element of computing: binary numbers. **Step-by-Step** shows how to copy your LPs to CD. Our **PDA** column will help you improve your proficiency with your handheld's character input system.

Operating Systems

Windows 98 shows how to make your system capable of booting both Windows and Linux. This month's **Linux** column shows you how to configure and use a CD writer the penguin way. **Mac OS** shows you how support for PlainTalk's speech recognition software has been enhanced in Mac OS 9.

Each column has a summary of the best shareware for each platform. Reviews and trial copies can be found on **apcmag.cd**.

Where is OS/2 Warp?

This month's **OS/2** column has been postponed until March. We apologise to readers for any inconvenience. To compensate, the next column will be double its normal size. The regular OS/2 Shareware section appears on this month's **apcmag.cd**.

Programming

Simple C++ revisits namespaces to clarify a few concepts and introduces the notion of inheritance. The **Java** column presents the basics of using graphical elements.

Bug of the month

Bugologist Andrew Ruan reported this as a bug (see screenshot), but we're not so sure. After all, international chess players will go to almost any lengths to put their opponent off. It might just be a really cunning ruse.



Win! Win! Win!

Workshop is always on the lookout for the most interesting, strange, funny or downright weird software bugs you can find. These include code snippets, features that function poorly, or things that crash a particular application. Anything and everything buggy deserves mention.

Send us your favourite bug via email to bugs@acp.com.au or snail mail to *APC* Bug of the Month, PO Box 4088, Sydney NSW 1028, and you'll be in the running to win a software prize. Please send screen captures, example code listings or detailed instructions to trigger a bug in an application, as appropriate for your entry.

The winner's name, along with details of the bug, will appear in this column in *APC* March. So start hunting!

Michael Smith

Pocketbooks

The penguin is back — again!

Australia's favourite Linux guide, the *Revised Edition Linux Pocketbook* was another sell-out success. For readers who missed out, the new and updated edition features the full release of Red Hat Linux 6.1 and OpenLinux 2.3.

Readers also have the opportunity to win a free entry ticket to the March 2000 Linux Open Source Expo & Conference.

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Workshop

Can you count to three? Well, that's a heck of a lot more than your computer can. **By Alex Kidman**

Technobabble

Many people find computer systems aggravating, and more than a little bit of a battle. The same people would no doubt be surprised to learn that their desktop adversary can't count in numbers greater than one. Computers use binary for everything, and binary has just two digits to represent either an on state (1) or an off state (0).

Does that mean my computer can only do two things?

Not really. Binary notation can be used to represent any number you'd care to name, but instead of using base-10 systems (where numbers are represented with a combination of 0 to 9), binary represents any given number as a combination of ones and zeroes. This is where things get a little complicated mathematically, but to simplify it, we'll look at how the number system works for both binary and non-binary numbers.

Dating with binary

Take the current year of 2000 (it's 1999 as I write this, but you get the point): 2000 represents 2,000 individual units, or ones, but it would be a real pain having to write out 1+1+1+1+1+1+1+1+1+1+1+1+1+1+1+1 . . . and so on. What most number systems do is represent large numbers like this as other numbers, multiplied by the base of the number system involved. Decimal notation uses 10 as its base (or radix, if you prefer), so numbers are represented by their relationship to that base number. For example, three can be represented as $3x10^0$ (any number, including 10, to the power of zero is one, so that's just 3x1=3). The number 2,000 has three zeros, and can be broken down as is seen in the table in the first column

First digit	Second digit	Third digit	Fourth digit
2	0	0	0
Significance			
2×10^3	0×10^2	0×10^1	0×10^0

Now, binary uses the same notation, but with only two digits: a 1 and a 0. Unsurprisingly, 0 is zero and 1 is one. Of course, things get tricky when you need to get higher than that, as the very familiar 2 simply isn't available. Fortunately, just as the number above can be expressed as numbers to the power of 10, in binary you use the same trick.

If you want to convert the binary sequence 101 to decimal, you would do the same, but using 2 as the radix. So 101 = $(1x2^2)+(0x2^1)+(1x2^0)$, which equals 5. Likewise, 2 (decimal) is represented in binary as 10, where the 1 represents $1*2^1$ (2) plus $0*2^0$ (0). Then 3 is represented as 11 $(1*2^1)+(1*2^0)$. It helps to have a clear idea, then, of the powers of 2, and they are:

$2^0 = 1$
$2^1 = 2$
$2^2 = 4$
$2^3 = 8$
$2^4 = 16$
$2^5 = 32$
$2^6 = 64$ and so on

Now, if we transpose those figures into a table, it also gives us a handy table for working out binary values (and a good way to show how they work).

How do you represent the decimal number 2000 as a binary sequence?

2^6	2^5	2^4	2^3	2^2	2^1	2^0
64	32	16	8	4	2	1

There are a couple of approaches. If you happen to know your powers of two up to above 10, you can work it out by finding the first largest value, then breaking down the remainder into the next highest power, and so on. This is a little fiddly, and does mean you end up having to remember a lot of powers of two. There is a shorthand method for calculating a decimal number's binary equivalent. We won't delve into the depths of the mathetical explanation behind the method, but it frees you from the need to know a vast range of powers of 2. Instead, you need only be aware that there are an awful lot of 2s in any binary number as there are 10s in any large decimal number, so you can determine binary notation in reverse form by dividing your chosen number by two, noting the remainder and continuing until you get to dividing by one. For the decimal number 2,000 applying the method would result in something like this:

$\frac{2,000}{2}$ = 1,000 remainder = 0
$\frac{1,000}{2}$ = 500 remainder = 0
$\frac{500}{2}$ = 250 remainder = 0
$\frac{250}{2}$ = 125 remainder = 0
$\frac{125}{2}$ = 62 remainder = 1
$\frac{62}{2}$ = 31 remainder = 0
$\frac{31}{2}$ = 15 remainder = 1
$\frac{15}{2}$ = 7 remainder = 1
$\frac{7}{2}$ = 3 remainder = 1
$\frac{3}{2}$ = 1 remainder = 1
$\frac{1}{2}$ = 1

Reading up the list, produces the binary sequence and therefore, to computers, we're living in the year 11111010000.

What does this have to do with computers?

Binary lies at the heart of why computers work at all. Even during the era of valve-based computers, binary was the basic computational block. Essentially what happens in a circuit (be it an integrated silicon circuit or an archaic valve) is that tiny currents are passed (or blocked) between circuits. A passed circuit is, of course, a 1, or a true result. A blocked result is a 0, or false result. Your computer consistently runs billions upon billions of these calculations every second, whether you're playing a game of Quake or designing in CAD. So, although

your PC can be seen to be a bit simple (things are either true, or they're not), it can be said to be extremely quick at being simple. It can tell whether or not thousands of connections are true or false, all at once. At the binary level it's almost impossible to get an error, unless the physical processor itself is damaged — and you'd notice that mighty quick.

Your computer looks at most of these data transactions as bits. Each true/false result is viewed as a separate bit, and if you stack eight bits next to each other, you get a byte. The largest single value you can get in a byte is eight 1s, which would represent 255. This gives you a range of 256 numbers (0 to 255 inclusive) to play with in a single byte.

Is programming done from 0 to 1, or 0 to 255?

Most of the time, the answer is 'neither'. Confused? Well, it's true that you can program in binary ('machine code'), and it is fast, reliable code, but it's tedious and fiddly. Most programming is done in other formats which can later be recompiled down to a binary format (for speed and reliability).

Programing using 0 and 1

This is where Boolean logic comes into the equation. Boolean logic uses a basic set of three logical gates to construct results based on simple inputs. Most computer systems use seven gates, although four of these are really just extensions of the three core Boolean operators (NOT, AND and OR).

The simplest Boolean argument is *NOT*. NOT acts as a mirror of sorts; that is, any input to a NOT gate will be inverted. If you give a true result to a NOT gate, it comes back false, and the reverse applies for true results.

The next gate in line is the *AND* operator, which compares two values. If they're both true, the result will come back true, otherwise it'll come back false. In the case of binary, this plays out like so:

The final Boolean value to consider is

Input one	Input two	Operator	Result
0	0	AND	0
1	0	AND	0
0	1	AND	0
1	1	AND	1

the OR operator. OR works by comparing values, and if at least one of them equals 1 (or true, or, in the case of a circuit, 'on') then the result will be true.

That's about as complicated as Boolean

Input one	Input two	Operator	Result
0	0	OR	0
1	0	OR	1
0	1	OR	1
1	1	OR	1

logic needs to get, but you can combine these three basic gates (NOT, AND, OR) to create four more.

Then there were seven

The first two gates are just a combination of a NOT gate and either one of the other two core gates. Just take an AND or an OR result, and invert it, and you've got a new gate. This produces the NOR and NAND gates.

The final two gates to consider are XNOR and XOR gates. These are again just simple combinations of previous gates. The X addition signifies that these are *exclusive* gates; in effect, they apply a filter to existing gates that exclude certain results — they only return the true (or 1) value if only one of the results is one, but not if both are. A simple table with the OR result included should clarify this so you can see the effect of the XOR:

Input one	Input two	Operator	XNOR result
0	0	XNOR	1
1	0	XNOR	0
0	1	XNOR	0
1	1	XNOR	1

The XNOR gate works in the same manner, but applies the exclusion filter to the NOR argument.

Input one	Input two	Operator	OR result	XOR result
0	0	XOR	0	0
1	0	XOR	1	1
0	1	XOR	1	1
1	1	XOR	1	0

So, how does your system uses these gates? Well, you'll just have to check next month's column to find out.

Alex Kidman can be contacted at alexk@acp.com.au. For a complete archive of *APC* Technobabble columns, see http://apcmag.com/babble/.

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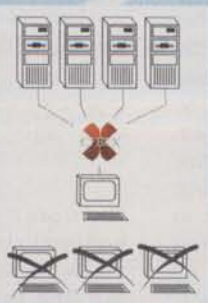


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Transferring LPs and tapes to CD.

By Daniel Rutter

Step by Step

Anybody who has a PC and a decent-sized music collection on cassettes or LPs has probably considered transferring some, or all, of it to compact disc. Now that the cost of disk space, CD writers and blank CDs have fallen to levels that make them accessible to the average consumer, it's not very difficult.

There are four steps in the transfer process: record the LP or tape to hard disk; clean up hiss and pops and clicks (this step is optional, but recommended); prepare the music to burn to a CD; and then burn it. Let's look at each step in turn.

Recording to hard disk

To record to hard disk you'll need a sound source, the right cabling, a decent soundcard, and audio recording and editing software.

Almost any recent brand name soundcard (for instance, a Sound Blaster 64 or higher or a Diamond Monster Sound) will produce better than acceptable recordings. Some cards still suffer from poor shielding and add internal computer noise to everything they record, but most produce quality that is surprisingly close to the quality of professional studio equipment. You can't expect a soundcard to give you the flexibility of studio equipment, but for a simple single stereo input they work perfectly well.

To transfer LPs to CD you'll need either a record player with a pre-amplifier or an integrated amplifier with a pre-amp and power amp in one box. The pre-amp is used to boost the low-level signal delivered by the record player. The output from almost all record players is no more than the tiny electrical signals produced by the needle cartridge, and that needs to be boosted to *line level*, which is the input level that your soundcard expects. The pre-amp also applies a bass-boosting equalisation curve to the signal from the record player, because all LPs are recorded with bass heavily attenuated. Connect the record player to the pre-amp's phono input.

If you're transferring tapes, you can connect the output from any tape deck (cassette or reel-to-reel) directly to the computer.

If you need to use a pre-amp, the output that you connect to the computer depends on your setup. Any rec-out connector intended for use in tape decks is fine for sending audio to the computer. However, amplifier and headphone outputs change levels in response to volume contsrol settings (tape output doesn't). You'll have to adjust the line-in gain using the volume control panel on your computer to suit the volume setting (if you use one of these).

To monitor the music that you're recording through your stereo speakers you'll need to connect your soundcard's output to a line in on your pre-amp. Any input connector (CD, tape, tuner, video), except phono or microphone, is suitable for computer sound input.

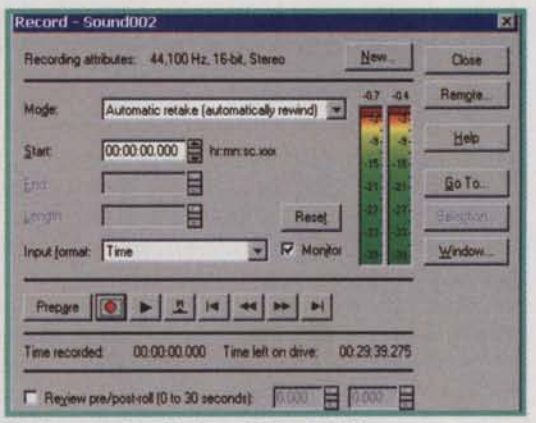
If you have an ordinary soundcard with one-eighth inch sockets on it, you may need an extra cable or two to make the connection from your sound source to the computer. For headphone socket to soundcard connections, use a one-eighth inch male to one-eighth inch male stereo lead and a one-eighth inch to a one-quarter inch adaptor. These adaptors are included with many sets of headphones, so you can use them with both sizes of headphone connector. For connecting from RCA outputs (located on the back of most stereo and tape decks), you'll need a one-eighth inch male to twin RCA plug lead and, possibly, a dual RCA extension lead if you can't get the computer close enough to the stereo.

If you hear an irritating hum under everything you digitise, the culprit is probably a difference in earth potential between the computer and the stereo system. Try using the one electrical outlet as the power source for all the appliances you are using — this may cure the problem. You should also check for an earth wire from the turntable if you're transferring LPs. Connect it if it's disconnected, and disconnect it if it's connected, and see if that helps.

Software

There are a lot of good PC sound recording and editing packages available. The current frontrunners in the lower price range are Syntrillium's Cool Edit 2000 and Sonic Foundry's Sound Forge 4.5 XP, but many CD writers will come with an acceptable package. Don't even think about using the Windows Sound Recorder; it really isn't adequate.

For basic audio transfer, you'll be doing the same things regardless of the software you choose. CD sound is 16-bit stereo at 44.1kHz (44,100 samples per second), so that's what you want to set the software to use. Mute all of the soundcard inputs and outputs you're not using (mic, MIDI, CD audio, and so on) in the Volume Control panel. Depending on the design of the soundcard, these may contribute noise — it doesn't hurt to mute them regardless.



Setting record level in Sound Forge 4.5 XP

When recording something digitally, it's very important to make sure that the input signal is never so high that it exceeds the maximum recordable volume. Analog tape systems can tolerate peaks that exceed their maximum recordable volume, but digital recorders can't; if it happens, you'll get nasty sound distortions. The audio-recording software you use should have a level monitor feature, which tells you the peak volume of a signal. Play the loudest part of the material you're converting and adjust the input gain until this part gets as close to, but doesn't hit, maximum volume. Don't go nuts trying to get as close as possible to the maximum. It's good to leave a little headroom. Also keep an ear out for any pops and clicks that might fool you into setting the gain too low. It's OK for pops and clicks to be louder than the permissible maximum, since you'll be filtering them out later.

All decent audio-recording software has a *normalise* feature that stretches the volume of what's been recorded so that its maximum level just matches the maximum recordable level. The closer you get the original recording to this level before normalising it, the higher the sound quality.

Most software can automatically start recording when it hears a signal — which, in the case of LPs, will usually be the pop of the stylus hitting the record — but if the package you choose doesn't have this feature, don't worry. Just hit the record button and then drop the needle or press Play at your leisure; it's easy to remove the opening and closing sections later.

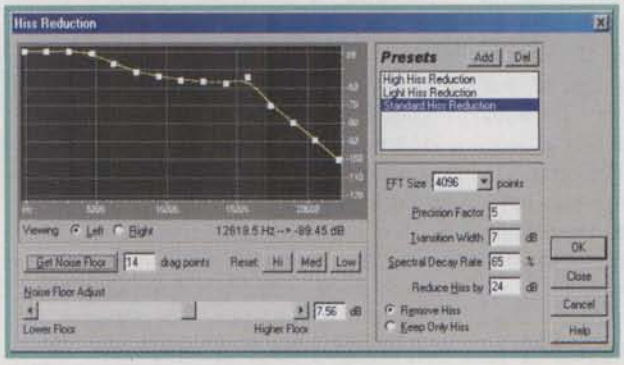
Cleaning up the sound

Stage two in the transfer process is getting rid of any nasty noise. You can usually achieve better results with tapes using this process, because they lack the pops and clicks that infest most LPs. However, tapes are likely to have more constant background noise (hiss).

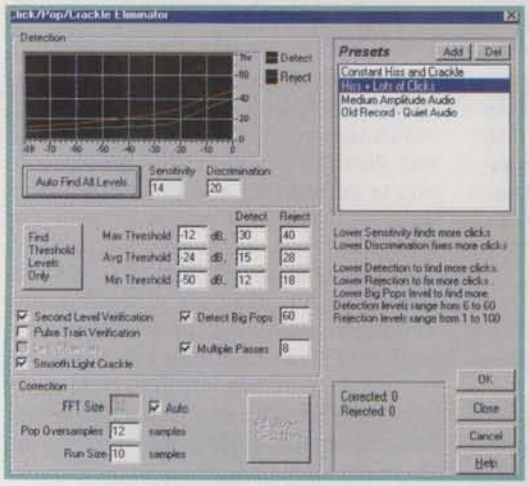
To minimise the pop and click problem, records should be thoroughly cleaned before playing. Using a weak detergent solution and a natural bristle brush, brush gently in the direction of the grooves to remove any dirt, if you can't afford a fancy squirt-and-vacuum cleaning machine. It also helps to have a good turntable; if the one you use isn't that great, see if you can borrow a better one. You should also make sure that you use a cartridge that isn't worn, and is using the right pressure and anti-skate settings. If the turntable normally sits somewhere that leaves it prone to interference from floor vibrations, consider moving it onto a hefty piece of furniture or some other suitably stable surface. Several of the better audio-recording packages now have automatic noise reduction filters, like the Audio Cleanup Plug-In for Cool Edit 2000, which can be configured extensively.

There are even packages, such as DART and DART Pro, which are specifically targetted at restoring old audio.

Some tape-hiss-reduction systems, including Cool Edit's, do their magic by taking a sample of hiss without music — such as you'll find on the beginning or end of the tape — and use that as a template to cut the hiss from the rest of the recording without significantly damaging the music.



There are several associated processing options in many sound editing packages, like the ability to remove a DC offset (where the average zero point of the waveform is above or below the actual zero value, where distortion is more likely) or fix skewed stereo balance. The better programs also have reasonably advanced equalisation features, with studio-style parametric equalisation. This can be used to add a bit more sparkle to the worn-out treble of old LPs, for instance, or apply a strong notch filter to the frequencies where hiss lives. You can play around with reverb effects or different flavours of audio exciter as well. The better editing packages have features that you'd only expect to find in very expensive dedicated audio processors.



Burning a disc

Once you've got the sound files set up the way you want them, burning them to a CD is easy. Any CD-mastering software will allow you to string together up to a CD's capacity of ordinary WAV files and burn them to a disc. Many also allow you to insert track breaks without placing each track in a separate file; if the software you choose doesn't permit track break insertion, you'll have to manually split the audio file you made from your tape (or each file from your LP) into separate tracks.

The best way to write a CD-R is in *disc-at-once* mode, a feature available on most new recording software. Disc-at-once burns the whole disc in one go, as opposed to *track-at-once* mode, which does each track individually. The latter lets you burn a CD in multiple sessions, which could be of some use if you're really short of disc space. Currently, CD writers and software let you set the length of the gaps between tracks in disc-at-once mode, but older or cheaper writers may leave long gaps or insert noise in the gap.

Most current PCs can burn CDs at speeds up to 4x (600K per second) without any special preparation — you can even keep on working on other things, as long as they don't place too much demand on the hard disk, crash the computer or otherwise interrupt the data flow to the disc. See Step by Step in *APC* June 1998, page 148, for a detailed discussion of CD-R.

Even if you're convinced that records sound better than CDs — and we won't get into that argument — having CD recordings of your favourite LPs has some obvious advantages. As the cost of CD writers falls below $400, and blanks only cost a couple of bucks each, it's not an expensive option any more.

Daniel Rutter can be contacted at dan@dansdata.com. For a complete archive of *APC* Step by Step columns, see http://apcmag.com/step/.

Further reading and links online

Syntrillium (makers of Cool Edit)
http://www.syntrillium.com/

Sonic Foundry (makers of Sound Forge)
http://www.sonicfoundry.com/

Digital Audio Restoration Technology
http://www.dartpro.com/

Diamond Cut Audio Restoration Tools
http://www.diamondcut.com/

CD-Recordable FAQ
http://www.fadden.com/cdrfaq/

Workshop

Combining the operating system you want with the one you need to have. **By Kieran MacNamee**

Windows 98

Many computer users have no choice about which operating system they use. Microsoft's Windows platform has such a monopoly in the computing industry that most PC users are forced to install and use the Windows operating system, even though many people consider it to be unstable and unsatisfactory. Since most software titles on the market pander to the user-friendly — if not always reliable — Windows platform, its hard to dismiss it altogether. If you can only afford one machine, it doesn't mean that you're limited to using only Windows; there is a way to let Windows and Linux share your system.

What is Linux?

Although many of you have probably heard about Linux, you may not know exactly what it is. Linux is an alternative operating system to Windows. It has been covered in the computer press for quite a few years, and recently the mainstream media has shown increasing interest.

Linux was created by the talented Linus Torvalds and is developed cooperatively by a community of enthusiasts. The result is a powerful, efficient operating system that improves steadily. To this day Linux is still free. This goal was writ large in the project's informal charter when it was first created.

Many people want to try it, but the average PC owner, struggling with the complexities of their current operating system and casting an anxious eye over their data, would consider it reckless to experiment with Linux. Even Linux enthusiasts are prepared to admit that it's less friendly than Windows. But why be content with Windows when there is something better?

Linux is a brilliant operating system, but it takes some time to master. If it already sounds like too much effort for you, then skip to the last part of the article, titled 'The easy way out'. If you are still intrigued, then read on and learn how easy it is to maintain Linux and Windows 98 on the one system.

Obtaining Linux

The Linux operating system is based around what is known as the *kernel*. At the time of writing the current version was 2.2.

The kernel is the core of every Linux operating system. The kernel is not licensed by a commercial entity; it is available under public licence agreement. However, many different companies have created their own versions of the interface that controls it.

These different flavours of Linux are known individually as distributions. There are many distributions available, each with its own unique features and qualities. Red Hat Linux is a popular distribution, but don't make the mistake of equating Linux and Red Hat; there are plenty of other commercial distributions of Linux.

There are numerous ways you can obtain Linux: you can download a distribution off the Internet; you can find a distribution on a magazine's cover CD; or you can purchase a commercially packaged distribution. Downloading from the Internet will take quite a while as the size of the most popular distributions is in the hundreds of megabytes.

When you purchase a commercially packaged distribution of Linux, you are not paying for the operating system; rather, you are paying for the distribution media, along with additional features that may be included. For example, Red Hat's Linux distribution not only contains the Linux operating system on CD, it also contains extra features such as technical support and hard copies of the manuals.

A popular way to obtain Linux in Australia at the present time is to grab a copy of *APC's Revised Edition Linux Pocketbook*. The most recent release of the pocketbook contains two distributions of Linux: Red Hat 6.0 and Caldera OpenLinux 2.2. The pocketbook provides information on how to install and use the Linux operating system.

Here you'll learn how to make your system capable of booting two operating systems. This is commonly referred to as dual-booting. Dual-booting the two operating systems is simple enough; there are many ways to do it and the methods outlined here should be applicable, regardless of the distribution of Linux you use.

Dual booting with LILO

LILO is shorthand for Linux Loader and comes with all distributions of Linux. Installation of LILO usually occurs when you install Linux, but may have to be installed separately in some cases.

LILO installs into your Master Boot Record (MBR) so that you are presented with the option of booting any one of two or more operating systems you have installed on your machine each time it starts.

At the LILO boot prompt you decide which operating system to load by typing in the label of the desired operating system. If you have not typed anything after five seconds, LILO will load the default operating system. To see which operating systems you can choose from, you simply press Tab.

One of the biggest queries people have regarding LILO is how to change the default operating system from Linux to Windows. It can become a big pain when you step away from your system after rebooting only to find that Linux has loaded by default when you actually wanted to load Windows.

LILO's configuration file is called lilo.conf and can be found in the /etc folder. Editing the lilo.conf is easy enough, but be careful not to make any mistakes or your system may become unbootable. All you have to do is log in to Linux as root and edit the file so that the operating system you want to be the default appears first. In a system with both Linux and Windows running, the lilo.conf file might look something like this:

```
boot = /dev/hda
install = /boot/boot.b

image = /etc/vmlinux
  label = linux
```

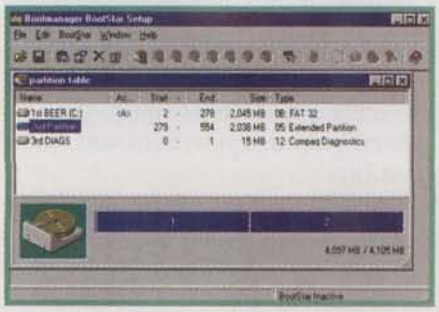
```
  root = /dev/hda1

other = /dev/hda2
  table = /dev/hda
  label = dos
```

In this case you just cut everything from other = /dev/hda2 down, and paste it above the line image = /etc/Image (depending on the number of hard disks you have and the partition from which you are booting Linux, your device enumeration may look different). This is fairly straightforward, but there is an easier way.

Linuxconf is a brilliant administration and configuration program that allows you to change many parts of Linux. This program is included with some of the latest versions of the popular distributions, but you can also download it from http://www.solucorp.qc.ca/linuxconf/. To run it, you simply log in as root and type linuxconf. In the LILO section you can make quite a few changes, such as adding other operating systems, but most importantly you can specify which operating system will boot by default.

If you do not want to mess with your MBR you can install LILO onto your Linux partition, and use a Linux boot disk or a third-party boot manager to access it. The



beauty of using a boot disk is that the operating system you use regularly will boot in the normal manner, unimpeded by LILO's usual delays and interruptions until you use it to start Linux. Check your Linux installation documentation for more information on creating a LILO boot disk.

You should be aware of a couple of things before you start using LILO. If you have OS/2 on your system, LILO will interfere with the OS/2 boot loader, so don't install it until you've read section 3.11 of the Linux FAQ. Also, if you ever reinstall Windows, the installation routine will make changes to your hard drive and remove LILO. You will need to use a LILO boot disk to reinstall it on to the MBR. For those with large hard drives, LILO will not install onto a partition that is located after the 1,024th cylinder of your hard drive. You must partition your Linux drives before this point.

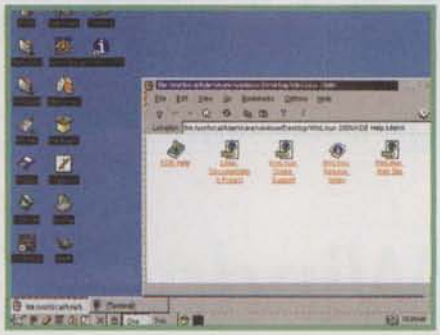
Dual-booting, third-party programs

Using LILO is a fairly easy way of booting multiple operating systems. However, you may wish to weigh it against other options.

There are numerous reasons why you might want to use a third-party program to control your system's booting procedure. These programs can support many operating systems, offer a more attractive and intuitive method of selecting the desired operating system, and they often include additional features such as virus protection. There are three programs for Windows or DOS that may be easier to use for those who are comfortable with the Windows environment.

PartitionMagic (http://www.powerquest.com/) is a popular utility that many people use to manage their hard disk partitions. It also contains a handy boot management utility called BootMagic that has a graphical interface, with mouse support, for loading different operating systems.

System Commander (http://www.systemcommander.com/) is a dedicated



boot manager that is simple to install and use. System Commander takes a lot of the tricky work out of your hands by detecting any new operating systems on bootup and automatically adding them to a menu that will appear each time your computer starts.

BootStar is not as well known as PartitionMagic or System Commander, but it provides some handy additional features. BootStar will let you create, and boot, up to 15 primary partitions on your system. You can download a trial version of BootStar from http://www.bootstar.com/.

The easy way out

If you are interested in trying Linux but you don't want all the hassles involved, then there is an alternative.

WinLinux2000, a version of Linux, takes all the fun and excitement out of installing Linux, but it provides the same flexible Linux environment within Windows. A final release should be available from its Web site (http://www.winlinux.net/). At the time of writing, WinLinux2000's final beta tests were almost complete. The download is approximately 140M, but it's well worth your patience.

Kieran McNamee can be contacted at kmcnamee@acp.com.au. For a complete archive of *APC* Windows 98 columns, see http://apcmag.com/win98/.

Windows 98 shareware

ChessPartner 4.2
Full-featured chess game featuring many advanced options, such as database capabilities and Winboard support.

Deep Green Reversi 4.2
Attractive version of Reversi aimed at beginners and experienced players alike. It supports Internet and network play.

David's Backgammon 3.1
Complete backgammon game with a wide range of features to meet the needs of players at all levels.

Four Winds Mah Jong 1.0.9
This is a full version of the traditional Asian tile game with numerous options and excellent support for beginners.

Chessvision 1.2 (Free Version)
Innovative program with a powerful chess database and analysis capabilities, support for multiple freeware chess engines and a useful interface for Internet chess servers.

All these packages can be found on this month's apcmag.cd, along with more detailed reviews.

Learning how to write CDs using Linux.

By Geoffrey Bennett

Linux

In order to record data and audio CDs using Linux, you need to know which CD-R hardware is compatible with Linux, which kernel drivers you'll need, and how to tell if Linux can talk to your writer. You also need to know how to create data suitable for writing to a CD and how to get that data onto a CD.

You can find some useful Linux-specific CD-R background information at http://www.fadden.com/cdrfaq/ and http://resource.simplenet.com/primer/primer.htm.

Hardware compatibility and kernel drivers

Linux supports almost all recent MMC-compliant, SCSI and IDE/ATAPI CD-R and CD-RW writers. If you have a SCSI CD writer, you will need a Linux kernel that has support for your SCSI adaptor as well as 'SCSI CD-ROM support' and 'SCSI generic support'. If you haven't compiled your own kernel, these features may already be turned on in the one supplied with your distribution.

If a CD writer is detected, messages like the ones below will appear in the kernel log (type dmesg to view).

```
(scsi0:0:6:0) Synchronous at 10.0 Mbyte/sec, offset 8.
Vendor: MATSUSHITA Model: CD-R CW-7502 Rev: 4.17
Type: CD-ROM ANSI SCSI revision: 02
Detected scsi CD-ROM sr0 at scsi0, channel 0, id 6, lun 0
scsi : detected 1 SCSI cdrom total.
sr0: scsi3-mmc drive: 8x/8x writer xa/form2 cdda tray
```

IDE/ATAPI CD writers may take a bit more work to configure because you need to load the kernel's ide-scsi driver, which is required to emulate a SCSI interface for your IDE drive. Once this driver is loaded, your IDE CD drives will appear to be SCSI drives from an application's point of view (that is, a CD-ROM device that was /dev/cdrom will now be /dev/scd0), and CD-recording software will be able to treat the drive as a SCSI drive.

Most kernels are built with IDE CD-ROM support included, and this must be disabled so that the IDE-SCSI driver can control your drive instead. Re-compiling your kernel with ide-scsi support instead of ide-cd support is the most common way to do this. In the Block Devices section of kernel configuration, turn on Enhanced IDE support, IDE/ATA-2 Disk support (assuming you have IDE hard disks), and SCSI emulation support, but turn off IDE/ATAPI CD-ROM support. If you had a real SCSI CD-ROM, you would also need SCSI CD-ROM support and SCSI generic support.

If your ide-scsi driver is loaded correctly, you'll see some kernel messages that are very similar to those in the log shown above for a SCSI CD-ROM. If you have a symbolic link from /dev/cdrom to /dev/hd*, you'll probably want to update this so that it points to the appropriate /dev/scd* device.

Parallel port IDE writers are supported through the paride driver, along with the pcd and pg drivers (which are functionally equivalent to the SCSI CD-ROM and SCSI generic drivers) and an appropriate low-level protocol driver. The file /usr/src/linux/Documentation/paride.txt lists the low-level protocol drivers that are supported and shows how to determine which one you need to use.

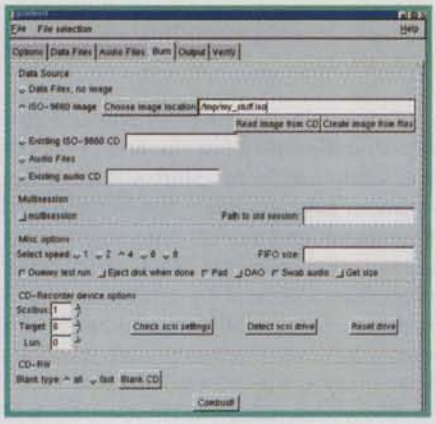
In addition to the hardware-specific device drivers, there are a few more kernel options that will be useful to turn on if you're building your own kernel. These options are ISO 9660 and Joliet (both in the Filesystems section), and loop device (in the Block Devices section).

ISO 9660 is the file system established by the International Organization for Standardization (ISO) for use on CD-ROM. Without support for this, you will be able to write CDs, but not mount them for reading. Joliet is a Microsoft extension of ISO 9660 for long filenames under Windows.

Technically, the loop device is used to turn a file into a block device. It will allow access to a CD-ROM image file as if it were a real CD; this is very useful for testing a CD before you actually write it.

Testing with cdrecord

Once the appropriate drivers are in your kernel, it's time to look at cdrecord, which is the program that will be talking to your CD writer. The cdrecord home page is located at http://www.fokus.gmd.de/research/cc/



glone/employees/joerg.schilling/private/cdrecord.html and the source is available for download from ftp://ftp.aarnet.edu.au/pub/cdrecord/ (for Australia) or ftp://ftp.fokus.gmd.de/pub/unix/cdrecord/.

Running cdrecord -scanbus will scan the SCSI bus (or buses, including the emulated SCSI/IDE bus if you have an IDE CD writer); a successful scan will output a message similar to that below.

```
scsibus0:
  0) *
  1) *
  2) *
  3) *
  4) *
  5) *
  6) 'MATSHITA' 'CD-R   CW-7502  ' '4.17' Removable CD-ROM
  7) *
```

This message tells the user that one SCSI device (at SCSI ID# 6) was found on the first SCSI bus (number 0). Any non-writer SCSI devices should also show up in the scanbus output.

The SCSI bus number and SCSI ID of the writer is important; you should make a note of them as they will be needed later to tell cdrecord which device to write to.

Creating and testing an ISO 9660 image

Writing a data CD with Linux is a two-step process. First, take the contents of a directory and generate an ISO 9660 image; next, write the image to a CD. Both steps can be combined to avoid wasting the hard

disk space needed (this can be up to 650M) for an on-disk copy of the CD image. To start, we'll consider the steps separately.

The standard utility for creating an ISO 9660 image is mkisofs, which is included with cdrecord. The simplest way to use it is:

```
mkisofs -r /home/geoffrey/my_stuff > /tmp/test.iso
```

This would create an ISO 9660 file system in a file called test.iso, and place the files contained in my_stuff within it. The -r switch says to enable the 'Rock Ridge' extensions and set all files to be root-owned and readable. The Rock Ridge extensions are used by Linux and Unix systems on ISO 9660 CDs to preserve, for example, long filenames and symbolic links that ISO 9660 doesn't support.

If you're creating a CD that will be used on a Windows 95 or later system, you'd probably use the -J switch with mkisofs so that it generates Joliet directory records for long filenames.

When you run mkisofs, you'll see messages telling you the shortened version of any long filenames; ignore these if you're using either Rock Ridge or Joliet extensions.

To test the image file you've created, mount the file as if it were a regular CD, but include the -o loop switch so that the loop driver can be loaded to make the file appear as a block device:

```
mount -o loop -r /tmp/test.iso /mnt/cdrom/
```

Check that your CD contains what you expect, unmount it with umount /mnt/cdrom (it's not a good idea to try to create a new image on top of test.iso if it's still mounted).

Writing an ISO 9660 image to a CD

You now have all the components necessary to write to a CD. A sample cdrecord command line to write a CD from our test ISO 9660 image is:

```
cdrecord speed=4 dev=0,6,0 < /tmp/test.iso
```

The speed option specifies the writing speed in the usual manner. The dev option specifies which CD writer device to use. Remember when you noted the SCSI bus and SCSI ID numbers after running cdrecord -scanbus? The SCSI bus number should be the first number after the =, the SCSI ID should be the second number, and the third number will almost always be 0 (it is the SCSI LUN, which is used if you have a multi-CD changer or similar device).

Before you actually ur first write to disc, you should perform a dummy run (by using the -dummy switch). This is where cdrecord goes through all the motions of writing a disc with the laser turned off so it doesn't burn the disc. Because CD writing is a real time process that cannot be interrupted, you will end up with an unusable CD if your machine is too slow or too heavily loaded while writing; a dummy run gives you the chance to fix the problem without wasting blank CDs.

Running mkisofs and cdrecord simultaneously

If you are familiar with how pipes work under Linux, it won't surprise you to know that you can run mkisofs and cdrecord at the same time so that you don't need to create a 650M temporary image file. Using the same mkisofs and cdrecord example as before, the command line would be:

```
mkisofs -r /home/geoffrey/my_stuff | cdrecord speed=4 dev=0,6,0 -
```

Creating an image file requires reading many files, possibly from across a whole disk, so you'll need a faster machine to successfully run mkisofs and cdrecord together. The '-dummy' option to cdrecord will let you know whether a write is likely to succeed.



Reading and writing audio CDs

Unlike copying a CD with a file system on it, reading digital audio data from a CD (known as digital audio extraction, or DAE) is a far more troublesome process (to find out why, consult the references listed at the beginning of this article).

Two common programs used for DAE are cdda2wav and cdparanoia. cdda2wav is included with the cdrecord package, and cdparanoia can be downloaded from http://www.xiph.org/paranoia/. Both programs can output WAV files, which can then be used with cdrecord like this:

```
cdrecord speed=4 dev=0,6,0 -audio track1.wav track2.wav . . .
```

This command will write to the CD in 'Track-at-Once' mode, which creates a two-second gap between each track. If you want to eliminate this gap, you need to write in Disc-at-Once mode, which can be done by using the -dao switch with cdrecord, but there is another program called cdrdao (http://www.ping.de/sites/daneb/cdrdao.html) that was designed for doing Disc-at-Once, and supports more CD writers in DAO mode than cdrecord does.

Geoffrey Bennett can be contacted at geoffrey@netcraft.com.au. For a complete archive of *APC* Linux columns, see http://apcmag.com/linux/.

Linux freeware

Qcad
A capable drawing package with all the basic things you need for CAD.

Xbill
Xbill is a simple GUI game, the object of which is to prevent a mad geek from achieving total network domination.

Emacs
Emacs is the grandaddy of all editors. You can use it as a simple text editor, or expand its capabilities by using its own extensibility language.

Nessus
A sophisticated security package that will scan any computers you manage and let you know if any of them have security problems.

All these packages can be found on this month's apcmag.cd, along with more detailed reviews.

More on making the most of Mac OS 9.

By Stephen Withers

Mac OS

A little knowledge of AppleScript can reduce the drudgery of repetitive tasks. During the last couple of years, Apple has acknowledged that AppleScript is one of the technologies that gives it an edge, so it has extended support for AppleScript in successive system software releases. Mac OS 9 is no exception, and this month we look at the way some of its new features support scripting.

Even if you're not a keen scripter, you may be interested in some of the issues discussed below, and you may find you can use one or more of the examples on this month's **apcmag.cd**.

Talking to scripts

As we discussed last month, PlainTalk speech recognition has improved markedly. If you do use speech recognition, you might like to use it to control your AppleScripts. That's where Speech Listener comes in.

Located in the Scripting Additions folder within the System Folder, Speech Listener provides a single command and returns a string containing the recognised phrase.

```
listen for a list of string -- list of possible phrases to listen for
        [with prompt string] -- text computer will speak as a prompt
        [giving up after integer] -- how many seconds to wait before giving up
        [filtering boolean] -- whether to skip phrases with special characters
```

As usual, there are some complications. The first parameter (a list of string) should be a list variable, not a constant. If you provide a constant, AppleScript will generate an error if any of the other clauses are present. Actually, it is better to use a variable, because then you can change the names of the commands in one place (wherever the variable's value is set). Otherwise, you'll need to hunt through your script looking for all occurrences of the strings.

The following script shows how you could change the scroll arrow settings in the Appearance control panel using a voice-controlled AppleScript:

```
set thecommands to {"single", "adjacent"}
set commandgiven to ""
tell application "Speech Listener"
        set thePrompt to "Set scroll arrow style to " & ¬
                item 1 of thecommands & " or " & ¬
                item 2 of thecommands & "?"
        try
                set commandgiven to listen for thecommands ¬
                        with prompt thePrompt giving up after 8
        on error
                say "Sorry, I didn't understand that."
        end try
end tell
if commandgiven ? "" then
        tell application "Appearance"
                if commandgiven = item 1 of thecommands then
                        set scroll bar arrow style to single
                else if commandgiven = item 2 of thecommands then
                        set scroll bar arrow style to both at one end
                end if
        end tell
end if
```

You may want to change the names of the commands, but after considerable experimentation we settled on 'single' and 'adjacent' as PlainTalk recognised them reliably. The script basically listens for a command, checks that it understood what was said, and then sets the corresponding scroll bar arrow style.

Unfortunately, the trick of setting scroll bar arrow style to «constant ****dubl» (see *APC* April 1999, page 141) does not work with the new version of Appearance. If it did, the script could be extended to give three choices.

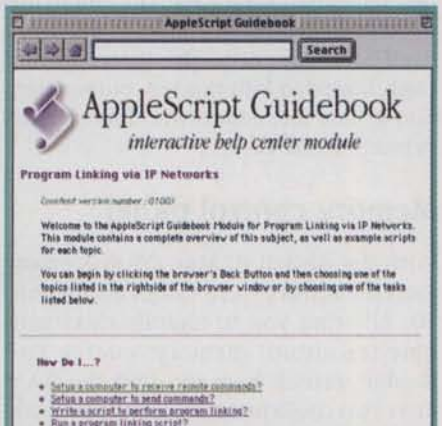
Sherlock 2

Sherlock's AppleScript dictionary has been expanded to allow for channels (collections of search sites with a common theme) in addition to specific search engines.

Take the following example:

```
tell application "Sherlock 2"
        set thelist to search Internet in channel "Reference" for "comet"
end tell
repeat with oneItem in thelist
        display dialog oneItem
end repeat
```

It uses the predefined Reference channel to search for the word 'comet'. This script merely displays each matching URL in a dialog box. A more realistic application of the script might do something useful, such as open each URL in a browser and save the pages for offline examination (though you may find it necessary to use a macro utility to access the browser's Save as command).



The AppleScript dictionary's select search sites statement has also been enhanced to support channels. The syntax is now:

```
select search sites a list of string -- the list of Internet search sites
        [in channel string] -- in the specified channel
```

Assuming you haven't modified the standard channels, using the new syntax in the following example will activate Bigfoot and Yahoo in the People channel.

```
tell application "Sherlock 2"
        set sitelist to {"ldap.bigfoot.com", "ldap.yahoo.com"}
        select search sites sitelist in channel "People"
end tell
```

Any sites in a channel that aren't explicitly activated are deactivated, regardless of their previous setting. The idea behind the new syntax is to use it to finetune automated searches within a channel. Raul has assembled a pretty impressive collection of extra Sherlock 2 channels at http://www.teamdraw.com/raul/stuff/MegaChannels.sit. Not all of them are useful in this part of the world, but they might inspire you to prepare your own custom channels.

Did you know that it is possible to display more than eight channel icons? Raul's documentation explains how to do this. The trick is to position the mouse over the four small lines below the channel bar, and drag downwards.

Raul, having taken an exception to Sherlock 2's brushed aluminium styling, has created a patcher to give it a more traditional Macintosh look, Sherlock Winzap. Unfortunately, Sherlock Winzap (http://www.teamdraw.com/raul/stuff/stuff2.3.html) will only work on unmodified versions of Sherlock 2. The patch runs a test to ascertain this before it will allow itself to be applied. The International English version fails this test, but we mention it here for readers who have the US version of Mac OS 9.

Memory control panel

With the arrival of Mac OS 9, Memory joins the ranks of scriptable control panels, allowing you to identify disks suitable for virtual memory, enable and disable virtual memory, and the RAM disk. This could be useful if you regularly change these settings to suit the requirements of particular programs. The following script activates virtual memory and the RAM disk, setting the latter to 5M (the parameter is specified in bytes).

```
tell application "Memory"
        set state of virtual memory to active
after restart
        set state of RAM disk to active
        set size of RAM disk to 5242880
--5M
end tell
```

If you were feeling brave, you might end the script with:

```
tell application "Finder"
        restart
end tell
```

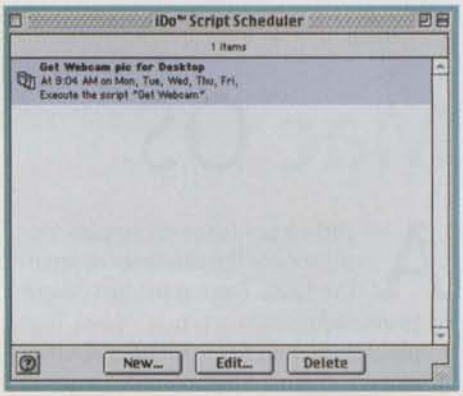
This would save you the trouble of restarting manually.

Other scripting snippets

Apple has issued a new module for the AppleScript Guidebook that adds a topic called 'Program Linking via IP Networks' covering the use of AppleScripts over IP. The Guidebook integrates with Mac OS Help and studying the examples reveals some very useful techniques. The latest module includes some interesting applications for AppleScript and shows how program linking can make use of the Keychain.

You can browse through all the current modules at http://www.apple.com/applescript/help_mods.html.

Sophisticated Circuits has updated its iDo Script Scheduler Lite so that it's compatible with Mac OS 9. As its name suggests, it lets you run scripts according to a schedule. For example you could use it to create a new desktop picture from your favourite Webcam once an hour or once a day.



The new version of iDo can be downloaded from http://www.sophisticated.com/products/ido/ido_ss.html. If you need to schedule more than three events, you can purchase an unlocking code online for $US24.95. The code gives you full functionality including the ability to trigger scripts via a hotkey or when there has been no mouse or keyboard activity for a certain period of time.

Programmable function keys

If you have access to a Mac with the ROM-in-RAM feature — that is, an iMac, iBook, the G3 PowerBook (bronze keyboard), G3 Power Mac (blue and white) or G4 Power Mac — running Mac OS 9, be sure to check out the new programmable function keys feature. This lets you assign applications or documents to function keys so you can open them with a single keystroke. To access the feature, open the keyboard control panel and click the button marked Function Key.

Stephen Withers can be contacted at swithers@ozemail.com.au. For a complete archive of *APC* Mac OS columns, see http://apcmag.com/mac/.

Mac OS shareware

QDesign MVP 1.0

The least expensive ripper/encoder presently available for the Mac, MVP incorporates a capable audio and video player, and a tool that lets you access CDDB databases and retrieve ID3 information that you can include in the MP3 files you create.

mp3voodoo 1.1

The most complete database utility for MP3 files, mp3Voodoo lets you construct any number of 'collections', each of which can have any number of associated playlists.

Macast Lite 1.5.3

Sharing the same player engine as the full version of Macast (one of the best available), the Lite version combines a simple but neat interface with the ability to play CDs and just about any MP3 file.

NetCD 1.6.7

If your MP3 player doesn't give you access to ID3 information, NetCD will give it to you. Simply insert an audio CD, click a button and NetCD will connect to an ID3-capable database on the Internet.

MacP3 1.5

If you download MP3 files from the Internet, or swap them with friends, MacP3 will provide you with a number of essential functions including the ability to edit ID3 tags and to modify files for use on Mac or PC.

All these packages can be found on this month's apcmag.cd, along with more detailed reviews.

Using your PDA's character recognition package — how to avoid stumbling at the first hurdle. **By Ronald Rosenbaum**

PDAs

One of the biggest misconceptions people have about PDAs is that they're as easy to use as paper or the keyboards with which they're already familiar. Some people give up on their PDAs in frustration when they find that they're not. It's worthwhile developing proficiency with your PDA's character input system, so we'll teach you how to do this.

It's generally much quicker to record the bulk of the information that you want to carry around on your desktop computer and then synchronise it with your handheld device. However, PDAs are very useful for storing information gathered on the road.

The three most common handwriting recognition systems are Graffiti, Jot and CalliGrapher. Graffiti is a standard inclusion with Palm Computing devices; Jot is standard on all Windows CE palm-size PC devices; and CalliGrapher is included on some CE and Psion devices, but is generally considered an add-on. Both Graffiti and Jot use a system that requires the user to learn a modified version of the Roman alphabet. CalliGrapher is slightly different. It learns the way you write and its recognition gradually improves over time.

We'll discuss the different aspects of each of these and provide some tips to help you get the most out of whatever you use. In addition to these packages there are some useful add-ons that can improve your speed and accuracy or serve as replacements for your built-in handwriting recognition system.

Graffiti

Graffiti has been around for many years. It is used on a huge variety of handheld computing devices. It was available for the early Apple Newton, Hewlett-Packard OmniGo and Magic Cap systems that had either poor, or no built-in handwriting recognition software at all. Currently, it is built into the Palm operating system and is the primary method of entering information.

Graffiti operates around a simplified version of the alphabet with a very specific way of drawing each character. Characters are done with a single pen stroke and, as its characters are based on those used to teach children how to draw the alphabet, it is relatively easy to learn.

Most characters are easy to remember, but there are a few that many people consistently have trouble getting right. Here are some general tips that the Graffiti novice should keep in mind.

- Use large pen strokes. Each stroke must start within the Graffiti area, but don't worry about staying inside the Graffiti writing area; writing larger generally improves accuracy.
- Draw your characters in a vertical fashion (perpendicular to the base of the screen), as entering characters on an angle will degrade accuracy.
- Ys can be difficult to draw. Try making a vertical figure-eight in the alpha section of the Graffiti screen.
- V can be made easier by making a U backwards (right to left).
- G is done more accurately when making a 6 in the alpha side.
- Just double tap to make a full stop.
- Tap once and draw an O to make the @ symbol.
- Practise the letters K and X; most people find these difficult to get used to.
- Running through the Graffiti tutorial and playing the Giraffe game will help you learn Grafitti quickly. The game is included on this month's **apcmag.cd**.
- Push the menu button (on the silkscreen) and select Graffiti Help from the edit menu (or just /G) to get help with Graffiti at any time.

Jot

Jot is generally associated with Windows CE devices, but there is a (fairly expensive) version available for the Palm platform at http://www.cic.com/. Jot is a little more forgiving than Graffiti as it will recognise several shorthand variations of each letter. Jot does a better job than other packages in recognising the way people actually write. However, there are a few characters — such as A, F, H, K, Q, T, Y, and 4 — that still need to be drawn a certain way.

Here are some basic tips for using Jot.

- Some CE units allow you to use *digital ink* in some places. Think of digital ink as an electronic notepad for taking down short messages on the run, storing them until you have time to enter them into a more appropriate place.
- Use the built-in note program to practise writing all the letters of the alphabet, numbers and common symbols that you use and you'll discover what you need to practise.
- To get help with Jot, press the Help button on your Jot entry screen. Unlike Graffiti, Jot doesn't list every character alongside its equivalent input-shape. Instead, it gives you an animated demo that shows you how to draw those characters you're having trouble with.

Whether you use Jot or Graffiti, you should study the character card that comes with your PDA. You might even want to paste it to the inside cover of your case or some similarly accessible place for quick reference. Don't be afraid to use the pop-up keyboard when necessary; sometimes it's quicker, especially for rarely used symbols like semicolons, percentage signs and ampersands.

CalliGrapher

CalliGrapher gradually learns the way you write and improves with time. It's very accurate and recognises both block and cursive characters. CalliGrapher comes as standard with some Windows CE units, or can be purchased separately. There are versions of CalliGrapher available for Psion units, clamshell-style CE units, and for Windows 98 and NT systems that use tablets. It is not currently available for the Palm platform due to its high processor requirements. It's difficult to get the full benefit of CalliGrapher's capabilities on a Palm PC because it's difficult to write in their small screens, but it works very well in scenarios where there is plenty of space to write. It is basically the same technology that the Newton OS used and has spent many years in development.

Demos versions of handwriting recognition enhancements and add-ons are included on this month's **apcmag.cd**. (see page 8).

Ronald Rosenbaum can be contacted at ats@nsw.bigpond.net.au. For a complete archive of *APC* PDAs columns, see http://apcmag.com/pdas/.

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Workshop

More on classes in object-oriented programming.

By Michael Smith

Simple C++

This month we'll begin with a quick discussion of namespaces and ANSI standards, then continue with the main topic: inheritance.

You may recall a discussion in this column about ANSI standards and namespaces, and why we use <iostream> instead of <iostream.h> (see *APC* June 1999, page 163). There is a very subtle difference in the code, which some readers may have missed.

This would explain the amount of feedback that we've received saying, 'I can't compile your examples'. So, it's probably worth explaining it again, this time focusing a little more on namespaces.

Since C++ first appeared in the mid-1980s, the language has undergone some major changes. C++, as described in the recent ANSI/ISO standard documents, is vastly different from the initial versions of the language. What is currently considered good programming practice is often illegal in older compilers.

Standard include files in older C++ compilers always had the suffix .h, as in <iostream.h>. The ANSI/ISO standard changed that, so that include files no longer have a suffix, as in <iostream>. If your compiler will not accept #include <iostream>, then it is suffering from a malady called age, which is not immediately fatal. Consider getting a new one.

For Windows users, Microsoft Visual C++ 6.0 and Borland C++ Builder 4.0 are both very good (although a little expensive). There are several free C++ compilers available on the Web, including the DJGPP compiler available from http://www.delorie.com/. Linux and Unix users can obtain the GNU C++ compiler free, and it comes highly recommended.

Newer compilers often support older C++ syntax for compatibility, but we're going to stick to ANSI/ISO C++ (Standard C++) in this column.

A major change to Standard C++ is the use of namespaces. The C++ standard library provides many functions and objects. Many developers also use third-party libraries that provide other functions and objects. When you create your own functions and objects you run a high risk of duplicating a name. This can cause serious problems. C++ now has a feature that uses the concept of namespacing to combat this problem. If an object or function is defined inside a particular namespace, then their names are not accessible outside that namespace. Functions outside the namespace can access entities from within the namespace by prefixing the entity name with the namespace name (see listing 1).

To avoid name clashes with the C++ standard library, all entities in the library have been defined in a namespace called 'std'. Thus, where an older compiler would refer to cout, a standard C++ compiler will refer to std::cout. There is an alternative to prefixing every library object with a namespace name. C++ provides a keyword 'using', where you can designate some or all of a namespace to be accessible.

If you include a line such as using std::cout;, you can then use cout without the std:: prefix. If you include using namespace std;, you can use any entity from the standard library without the prefix.

So should you utilise the using namespace command? Bjarne Stroustrup (the creator of C++) doesn't recommend it. His view is that the namespace protection is needed, and the danger of problems is too high. Some other authors disagree, but none with credentials to match Stroustrup. For the small example routines, such as those used in this column, it's probably safe. For bigger projects it's probably not. As the code listed in *APC* must fit into 30 character columns, we're going to use the using namespace std command to save a few characters. For real life projects, we generally recommend that you don't do that.

Splitting heirs

In discussing object-oriented (OO) programming, we've concentrated on its ability to simplify code — thus rendering the code more robust and maintainable. OO programming can also help achieve a second goal: code reusability. Software managers have long been trying to find effective ways to reuse the programs (or at least parts of them). Writing code is expensive, so if you can reuse existing code you can potentially save lots of money. The biggest problem with using old bits of code is that you often need to change it a little. Your program is just a little bit different. Pretty soon you get multiple versions of the code floating around. A bug gets fixed in one, but not in others. It all gets too messy. OO provides a solution called inheritance.

When creating a new class, you can declare it to be a *subclass* of an existing class. The subclass (also called a 'derived class') then inherits properties from the existing class (also called a base class).

Consider listing 2. The class Point is declared as a base class. Then the class Circle is declared as a derived class. Circle inherits the Set(), GetX() and GetY() methods from Point. While it could have inherited the Draw() method, we have replaced it with a new Draw() method. The Circle has it's own radius data, and the additional GetRadius() and SetRadius() methods to manipulate them. The Circle does inherit the x and y properties from Point, but because they are private they cannot be accessed directly. Thus the Circle.Draw() method will need to call GetX() and GetY(), rather than accessing x and y directly. Through this, we can encapsulate the inner workings of Point from Circle, and Circle relies upon the public interface.

As well as public and private members, a class may have *protected* members. A protected member is much like a private member, but it is accessible by derived classes. In listing 3, the x and y data members of Point are directly accessible by Circle.

Notice the syntax for the declaration of the derived class, class Circle : public Point. The word 'public' means that public members of Point will also be public in Circle. We could, instead, have used the

C++ source code

Listing 1

```
namespace MyApp {
  int MyFunc();
  const double MyVal = 3.456;
}

void func()
{
  int x = MyApp::MyFunc();
  double y = 2 * MyApp::MyVal;
}
```

Listing 2

```
class Point {
public:
  void Draw();
  void Set( int x0, int y0 );
  int GetX();
  int GetY();
private:
  int x, y;
};

class Circle : public Point {
public:
  void Draw();
  void SetRadius( int r );
  int GetRadius();
private:
  int radius;
};
```

Listing 3

```
class Point {
public:
  void Draw();
  void Set( int x0, int y0 );
  int GetX();
  int GetY();
protected:
  int x, y;
};

class Circle : public Point {
public:
  void Draw();
  void SetRadius( int r );
  int GetRadius();
protected:
  int radius;
};
```

Listing 4: Circle.cpp

```
#include <iostream>
using namespace std;

class Point {
public:
  Point();
  Point(int x0, int y0);
  ~Point();
  void Set( int x0, int y0 );
  int GetX();
  int GetY();
private:
  int x, y;
};

class Circle : public Point {
public:
  Circle();
  Circle( int x0, int y0,
          int r );
  ~Circle();
  void SetRadius( int r );
  int GetRadius();
private:
  int radius;
};

Point::Point()
{
  cout<<"Default constructor"
      <<" for Point\n";
}

Point::Point(int x0, int y0)
{
  Set( x0, y0 );
  cout << "Alternate "
       << "constructor for "
       << "Point\n";
}

Point::~Point()
{
  cout << "Destructor for "
       << "Point\n";
}

void Point::Set( int x0,
                 int y0 )
{
  x = x0;
  y = y0;
}

Circle::Circle()
{
  cout<<"Default constructor"
      <<" for Circle\n";
}

// This constructor
// explicitly calls the
// constructor for Point
Circle::Circle
    ( int x0, int y0, int r )
    : Point( x0, y0 )
{
  SetRadius( r );
  cout << "Alternate "
       << "constructor for "
       << "Circle\n";
}

Circle::~Circle()
{
  cout << "Destructor for "
       << "Circle\n";
}

void Circle::SetRadius(int r)
{
  radius = r;
}

int main()
{
  Circle c1;
  Circle c2(4,4,4);
  return 0;
}
```

apcmag.cd

word 'private', which would mean that public members of Point would be private in Circle, or we could have used the word protected with predictable results.

When an object of a derived class is instantiated, the base class' constructor must be called to initialise the base class' members. The base class' constructor will execute first, then the derived class' constructor. When the object is destroyed, the order is reversed: the derived class' destructor is called first, followed by the base class' destructor.

By default, the base class' default constructor is called. However, you can specify a particular constructor to be called. Look at the implementation of the second constructor for Circle in listing 4. The constructor specifies the alternate constructor for Point, and specifies which arguments will be passed to it. This allows you to control the initialisation of the base class.

Next month we'll look further at inheritance, and touch on the arcane art of polymorphism. Until that time, keep on coding.

Michael Smith be contacted at emmenjay@zip.com.au. For a complete archive of Simple C++ columns, see http://apcmag.com/simplec/.

The basics of graphics programming in Java.
By David Williams

Java

During the past few months, you have been writing applets that run on the Web. You have used graphical components like buttons, checkboxes, radio buttons and text fields, which allows you to make applets that respond to user input. They also allow flexibility in how data is entered into the applet.

Rather than using existing components such as a button that has a shape and behaviour, this month you will draw lines, rectangles, ovals, polygons and arcs directly on the screen. Java has *graphic primitives* to do this. These primitives can be outlines either without a fill, or with a fill of any colour you desire.

Listing 1 is a simple Hello World applet that writes, of course, 'Hello World' onto the applet window. Listing 2 contains the HTML file needed to invoke it. Open the list1.html file in your (Java-enabled) Web browser, or the Applet Viewer and you will see the message.

How does this work? The applet is very simple, but there are three important things to consider.

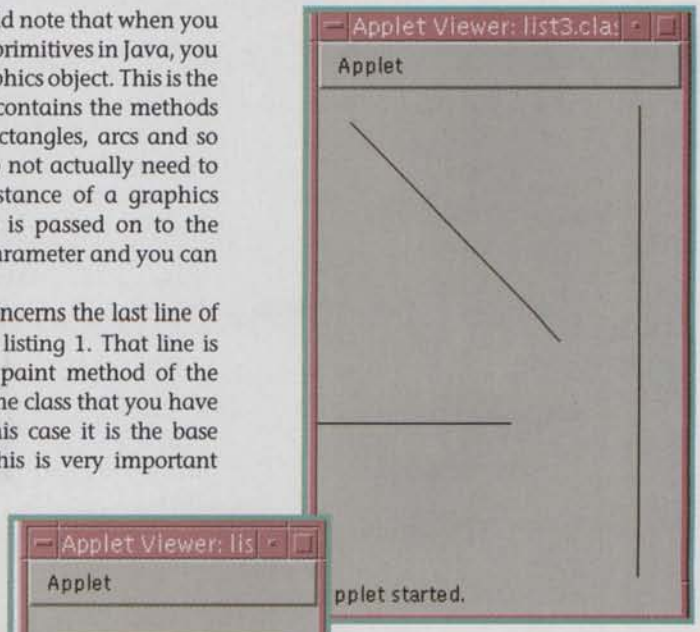
First, an applet in Java inherits methods and properties that pre-exist in the class java.applet.Applet. Whenever you create a new applet, it automatically has all these methods and properties. The paint method has been predefined by the base Applet class and is invoked by an instance of the Applet object itself. When you inherit from this base class to make your own applets, you receive a paint method automatically. This method is called, whether you realise it or not, when the screen is to be redrawn.

You can override the method to perform your own special processing whenever the screen is drawn, and this is how your applet works: you define a paint method and, even though you never explicitly call it, it is invoked behind the scenes.

The same reasoning expalins why you define an init method at the beginning of your applet, and why it runs even though you don't call it anywhere directly. It is also predefined in the base Applet class and called there. You can thus implement a paint method of your own which is called from the applet when needed.

Second, you should note that when you wish to use graphics primitives in Java, you need a java.awt.Graphics object. This is the object that actually contains the methods for drawing lines, rectangles, arcs and so on. However, you do not actually need to create your own instance of a graphics object, because one is passed on to the paint method as a parameter and you can just use it.

The third point concerns the last line of the paint method in listing 1. That line is actually calling the paint method of the superclass; namely, the class that you have inherited from. In this case it is the base Applet class itself. This is very important because, as you might imagine, the default paint method does a lot of work. Without it, any minimised windows could never be redrawn, and windows that were partially occluded by another could never be fixed. If you ran the applet with a new paint method that simply displayed 'Hello World' then this would be all you could see in the window. The background would never be redisplayed should the window need refreshing. So, you call the paint method of our superclass, passing the variable g as a parameter (where g is the instance of the Graphics object that was passed in).





The Graphics object contains many methods. If you have unpacked the src.zip archive that comes with the JDK, you will be able to see this in the source code for java.awt.Graphics. Perhaps the simplest method is the one that creates a straight line, so let's begin our explorations there. The drawLine method needs four parameters to specify the top, left, right and bottom values that make up the coordinates for that line; effectively, this specifies its position, width and length.

Listing 3 is a Java applet that draws three lines: one at an angle, one vertical and the last horizontal. Listing 4 is the HTML file needed to invoke the applet.

Moving on to rectangles, Java provides three different types of rectangles. Each may be filled, or left empty when drawing on the screen. To draw any rectangle, you must supply four arguments: the X and Y coordinates of the upper-left corner, and the rectangle's width and height.

Listing 5 provides Java code to display two rectangles: one empty using the drawRect method, and the other filled using fillRect. As it turns out, the rectangles are perfect squares because you have used the same values for both height and width. Use listing 6 to run the applet in your Web browser.

Java also allows you to create rectangles with rounded corners, rather than the sharp corners of the rectangles such as those you just created. The methods here are drawRound-Rect and fillRoundRect. These work in the same way as the drawRect and fillRect methods, except they require two additional parameters, arcWidth and arcHeight. These integer

Java source code

Listing 1

```
import java.applet.*;
import java.awt.*;

public class list1 extends
Applet
{
  public void paint (Graphics g)
  {
    g.drawString ("Hello
World!", 50, 100);
    super.paint (g);
  }
}
```

Listing 2

```
<html>
<head>
<title>Hello World</title>
</head>

<body>
<applet code="list1.class"
width="200"
height="200"></applet>
</body>
</html>
```

Listing 3

```
import java.applet.*;
import java.awt.*;

public class list3 extends
Applet
{
  public void paint (Graphics g)
  {
    g.drawLine (20, 20, 150,
150);
    g.drawLine (200, 10, 200,
300);
    g.drawLine (0, 200, 120,
200);
    super.paint (g);
  }
}
```

Listing 4

```
<html>
<head>
<title>Line demo</title>
</head>

<body>
<applet code="list3.class"
width="220"
height="300"></applet>
</body>
</html>
```

Listing 5

```
import java.applet.*;
import java.awt.*;

public class list5 extends
Applet
{
  public void paint (Graphics g)
  {
    g.drawRect (15, 20, 150,
150);
    g.fillRect (15, 185, 150,
150);
    super.paint (g);
  }
}
```

Listing 6

```
<html>
<head>
<title>Rectangle demo</title>
</head>

<body>
<applet code="list5.class"
width="190"
height="350"></applet>
</body>
</html>
```

Listing 7

```
import java.applet.*;
import java.awt.*;

public class list7 extends
Applet
{
  public void paint (Graphics g)
  {
    g.drawRoundRect (20, 20,
130, 150, 50, 10);
    g.fillRoundRect (20, 185,
150, 150, 30, 30);
s
    super.paint (g);
  }
}
```

Listing 8

```
<html>
<head>
<title>Rounded Rectangle
demo</title>
</head>

<body>
<applet code="list7.class"
width="190"
height="350"></applet>
</body>
</html>
```

Listing 9

```
import java.applet.*;
import java.awt.*;

public class list9 extends
Applet
{
  public void paint (Graphics g)
  {
    g.drawRoundRect (20, 20,
150, 150, 150, 150);
    super.paint (g);
  }
}
```

Listing 10

```
<html>
<head>
<title>Rounded Circle
demo</title>
</head>

<body>
<applet code="list9.class"
width="190"
height="350"></applet>
</body>
</html>
```

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values determine the horizontal and vertical diameters of the arcs used on each corner of the rectangle. This allows you to control the sharpness or roundness of the corners of the rectangles.

Listing 7 is an example of using rounded rectangles; listing 8 is the HTML to run it. The last two parameters in drawRoundRect and fillRoundRect are arcWidth and arcHeight. The larger these values become, the more rounded the rectangle.

To draw a circle using the rounded rectangle methods, simply provide the height and width of the rectangle for these two additional parameters. This can be seen in listings 9 and 10.

Graphics programming in Java will be explored in more depth next month.

David Williams can be contacted at dave@qed.newcastle.edu.au. For a complete archive of *APC* Java columns, see http://apcmag.com/java/.

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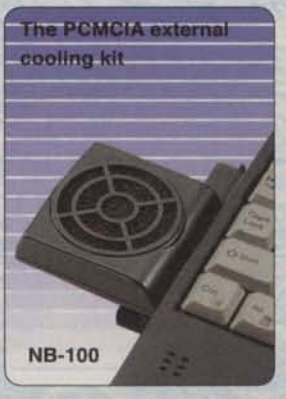
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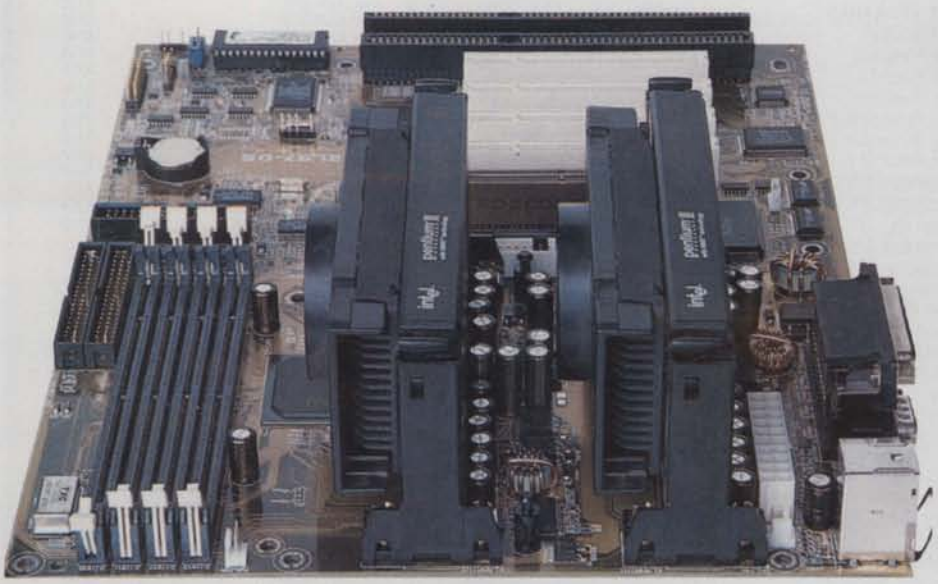
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1.44 Mb FDD	Aopen KX45 ATX Case	104 Keyboard	104 Keyboard	104 Keyboard	1.44m FDD
104 keyboard	1.44 Mb FDD	MS IntelliMouse	A4 Tech Mouse	Mouse & Pad	104 Keyboard
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HDD	3.2g	3.2g	3.2g	4g	4g	6.4g	4g	4g	6g
CD	20x	20x	24x	24x	24x	4xDVD	24x	24x	DVD
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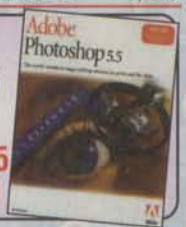


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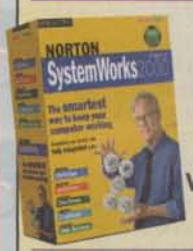




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CANON BJ10/BJ200/BJ210/BJ210sp/BJ255sp	7	C2/C2A
CANON BJC600/610/620	15	C5
CANON BJC4000/4100 /4200/4550 BCI-21/20	50/8	C8
CANON BJC 6000	4	C19
CANON BJC 7000	12	C15
HP DESKJET 400, 500 & 600 SERIES	7	H2/H4
HP DESKJET 820C/850C/855C/870C/1000C	6	H6
HP DESKJET 720/890/Officejet 1150	6	H13
HP DESKJET 1200 B, Y, C, M	6	H8
EPSON STYLUS COLOUR 750/900/1200	12	E#
EPSON STYLUS 400/800/1000	8	E1
EPSON STYLUS COLOUR / PRO / XL	6	E2
EPSON STYLUS 820 / COLOUR 11/11S/200	12	E4
EPSON COLOUR 400/500/600/700/Photo Ex	12	E7
EPSON COLOUR 440/640/740/800/850/1520	12	E7
EPSON STYLUS COLOUR 750/900/1200	12	E14
IBM 4076/LEXMARK	6	M1
OLIVETTI	8	H1
XEROX 4004/C.ITOH CJ300	6	M3

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CANON BJC 6000	4	C20
CANON BJC70/80	60	C11
CANON BJC210/BJC210sp/BJC255sp	10	C3
CANON BJC600/610/620	8	C6
CANON BJC4000/4100/4200/4550 BCI-21	30	C9
CANON BJC 7000	6	C16
HP DESKJET 400, 500 & 600 SERIES	12	H3/H5
HP DESKJET 820C/850C/855C/870C/1000C	6	H7
HP DESKJET 720/890/Officejet 1150	4	H14
EPSON STYLUS COLOUR / PRO / XL	6	E3
EPSON STYLUS 820/COLOUR/11/11S	12	E5
EPSON COLOUR 200/400/500/600/800/1520	12	E8/E9
EPSON COLOUR 440/640/740	12	E9
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HP Deskjet 600,660,690,692,694 inks not sanme as 500's	K2BK *	9 *	K10CLR	12
HP Deskjet 720, 722,870,880, 890, 893	K3BK	6	K22CLR	6
HP Deskjet 850, 855 (colours not same as 700/720)	K3BK	6	K11CLR	6
HP Deskjet 1600	K5BK	6	K12CLR	3
HP Desijet 1200	K5BK	6	K12CLR	3
HP Deskjet, Deskwriter, Portable, Designjet, 300, 320	K1BK *	9 *	K9CLR	12
HP PHOTOSMART Star & Moon combined			K25CLR	6
Canon BJ-30, BJC-70, BJC-80	K7BK	60	K1CLR	30
Canon BC-01, BC-02, BJC-210	K8BK	7	K2CLR	12 *
Canon BC-03, BC-3X (fax) BJC-210sp, BJC-255sp	K4BK	7	K2CLR	12 *
Canon BC-06 photo			K23CLR	6
Canon BJ-300, 330	K9BK	7		
Canon BJC-600, 610, 620	K10BK	15	K3CLR	8
Canon BJC-800, 820, 880	K11BK	12	K4CLR	4
Canon BJC-4000,4100,4200,4300,4550,5000,5500 BCI-21	K12BK	50	K5CLR	30
Canon BJC-4000,4100,4200,4300,4550,5000,5500 BC-20	K12BK	9 *	K5CLR	30
Canon BJC-5000/ 5500 / 6000 BC-23	K27BK	6	K5CLR	30
Canon BJC 7000, 7100 BC-60 BC-61	K19BK	2	K24CLR	12 *
Canon BJC 7000, 7100 photo BC-62			K15CLR	12 *
Epson Stylus Color 800 / 1520	K13BK	12	K20CLR	12 *
Epson Stylus Color 200 / 820 Color 11 / 11s	K16BK	12	K7CLR	12 *
Epson Stylus 400 / 800 / 800+ / 1000	K14BK	12	K6CLR	12
Epson Stylus Color Pro / XL	K15BK	8	K6CLR	6
Epson Stylus Color 400 / 600	K17BK	12	K20CLR	12 *
Epson Stylus Color 500 Not the same inks as the 400 / 600	K17BK	12	K8CLR	6
Epson Stylus Photo / Photo EX / photo 700	K17BK	12	K17CLR	12 *
Epson Stylus Color 3000 / 5000	K21BK	3	K34CLR	3
Epson Stylus Color 440 / 640 *Not the same ink as 400/600	K26BK	12	K16CLR	12 *
Epson Stylus Color 740 (900 & 1200 available)	K6BK	12	K16CLR	12 *
Epson Stylus Color 750 photo	K6BK	12	K35CLR	6
Epson Stylus Color 300 (four colour cartridge)			K33CLR	12 *
Lexmark/IBM 4076/1020/2030/2050/2070/1000	K18BK	6	K13CLR	12
Lexmark/IBM 2030 / 2050 waterproof	K24BK	6	K13CLR	12
Lexmark/IBM 2030 / 2050 photo			K29CLR	12
Lexmark/IBM 5000, 5700, 7000 (photo available)	K25BK	6	K30CLR	12
Olivetti JP150/170/192/250/350/360/450/3100	K20BK	8	K19CLR	12

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15184	A3 90GSM HI RESOLUTION PAPER	200	$ 74.90
16612	A4 WHITE 100UM PHOTO FILM	50	$ 52.90
15186	A3 WHITE 100UM PHOTO FILM	100	$199.00
16611	A4 CLEAR 100UM TRANSPARENCIES	50	$ 42.90
16425	A4 150GSM FULL GLOSS PHOTOBASE	50	$ 49.90
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Epson	EPS SO200108	$15.00 *
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Epson	EPS S020036	$22.00 *
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Epson	EPS S020089	$22.00 *
Epson	EPS SO2110	$27.00 *
Epson	EPS S020118	$39.90 *
Epson	EPS SO20126	$39.90 *
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9.1 GIG QUANTUM KA+ ULTRA 66 HD 7200 RPM	241
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10.2 GIG WESTERN DIGITAL ULTRA 66 5400	231
10.2 GIG QUANTUM CX ULTRA 66 5400 RPM	226
13.5 GIG IBM HARD DISK DRIVE	273
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13.0 GIG QUANTUM CX ULTRA 66 5400 RPM	252
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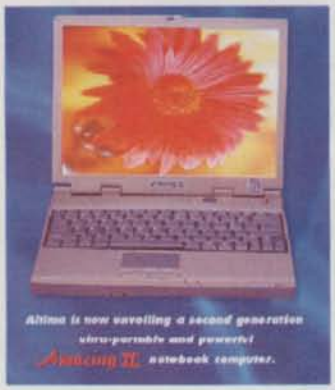
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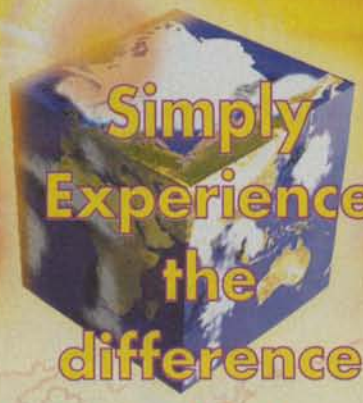
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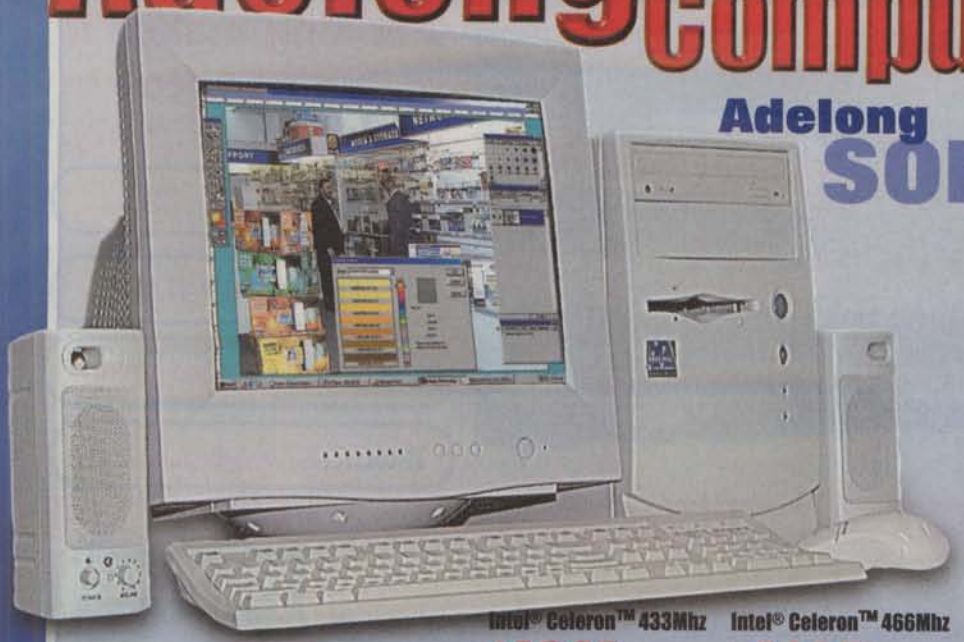
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56K External Voice/Fax/Data Modem

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February 2000

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- 100Watt Stereo Speakers
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- Integrated 10/100 Ethernet
- Minitower Case
- Mouse & Keyboard
- Windows 98

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See page 16

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The world's smallest 2.11 megapixel digital camera with Zoom lens. This camera's ease of use rivals that of traditional cameras including features such as spot metering and AE lock. It has an 8X digital zoom and rapid shot-to-shot cycling, capable of storing 61 images on it's standard 8Mb CF card and has a maximum image resolution of 1600x1200. The digital camera has finally come of age! Compatible with Windows 95/98, NT 4.0 and Macintosh via USB and serial interfaces.

HITACHI CM 766 19" Monitor



- 18" Viewable image
- 0.21mm Horizontal Mask Pitch
- Max Resolution 1600x 1200 @75Hz
- Dimension: 448Wx 442Hx 447Dmm

Editor's Choice apcmag January 2000

$1065 MOHI002

See page 21

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$49 PSJAC000

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Processor	AMD K6-2 400Mhz
Memory	32MB SDRAM
Hard Disk	4.3GB Hard Drive
Display Card	Trident Cyber Blade 4MB AGP
Monitor	15" Colour Monitor
CD-ROM	40X CD-ROM
Sound Card	16bit PCI Audio
Speakers	120Watt Stereo Amplified Speakers
Mouse	PS/2 Mouse
Keyboard	104 key WIN95 Keyboard
Modem	56K Soft Modem
Software	MS Windows 98 Second Edition, Lotus Smart Suite, Lotus Notes R5 Client, IBM Perfect Photo, Winfax Lite, Norton Anti-virus, Acrobat Reader.
Warranty	2 Year Return to Base.

$1195
SYEVE000

Explora MP450X

Processor	AMD K6-2 450Mhz
Memory	64MB SDRAM
Hard Disk	6.4GB Hard Drive
Display Card	Trident Cyber Blade 8MB AGP
Monitor	15" Colour Monitor
DVD-ROM	6X DVD-ROM
Sound Card	16bit PCI Audio built-in
Speakers	120Watt Stereo Amplified Speakers
Mouse	PS/2 Mouse
Keyboard	104 key WIN95 Keyboard
Modem	56K Soft Modem
Software	MS Windows 98 Second Edition, Lotus Smart Suite, Lotus Notes R5 Client, IBM Perfect Photo, Winfax Lite, Norton Anti-virus, Acrobat Reader, Power DVD.
Warranty	2 Year Return to Base.

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- 10X DVD-ROM Drive
- Altec Lansing ACS33 Speakers & Subwoofer
- 17" Colour Monitor
- ATX Mid Tower Case
- 56K V.90 PCI Fax/Modem
- Microsoft Intellimouse
- Microsoft Windows 98
- 2-Year Limited Warranty

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- Turtle Beach Montego II PCI Sound Card
- 10X DVD-ROM Drive
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- Turtle Beach Montego II PCI Sound Card
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- Altec Lansing ACS54 Speakers & Subwoofer
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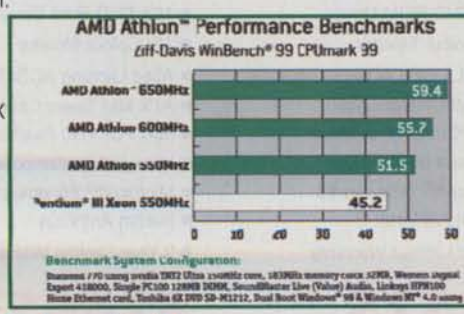
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- L1 Cache size 128Kb
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See page 7 for our new Gigabyte Athlon Mainboard



Code	Model	Price
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CPAMD021	AMD Athlon Processor 550Mhz	$655
CPAMD022	AMD Athlon Processor 600Mhz	$945
CPAMD023	AMD Athlon Processor 650Mhz	$1165
CPAMD025	AMD Athlon Processor 700Mhz	$1495

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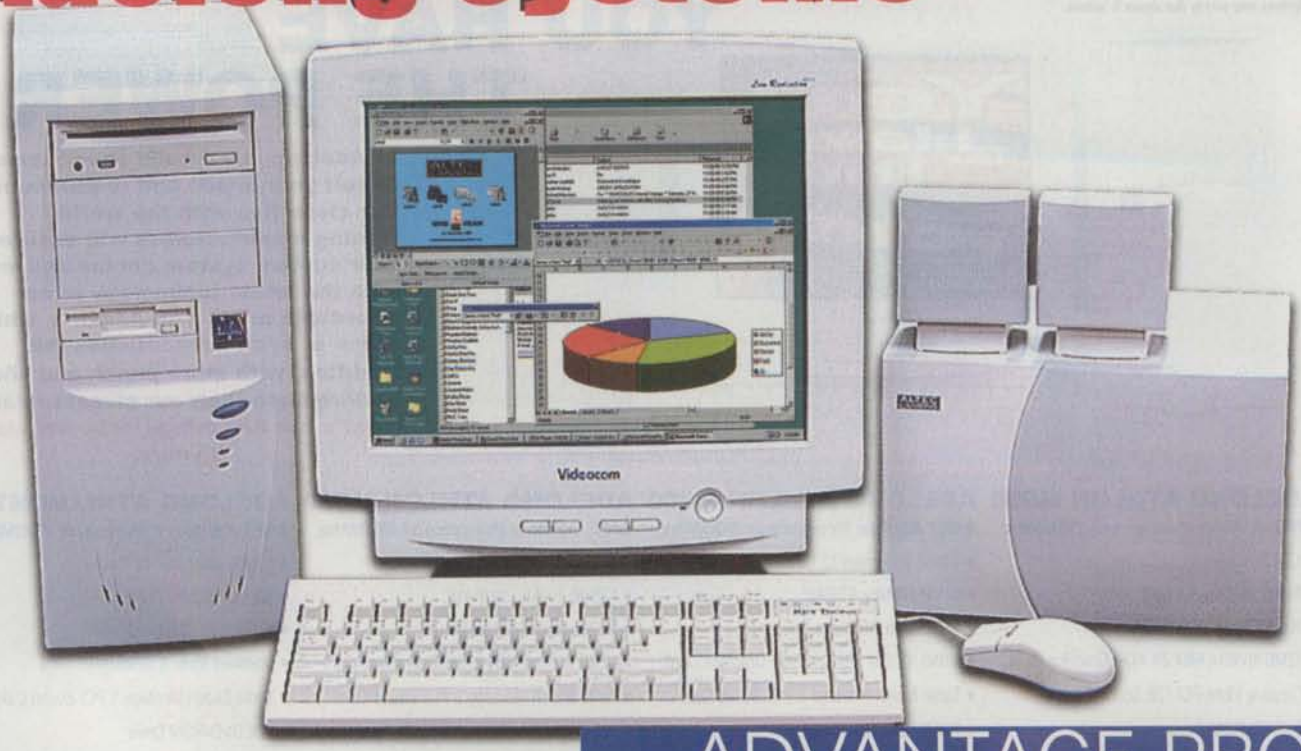
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• 10GB Ultra ATA Hard Drive	• 13GB Ultra ATA Hard Drive	• 13GB Ultra ATA Hard Drive	• 13GB Ultra ATA Hard Drive
• 3DFX 16MB Voodoo III 2000 AGP	• Matrox Millennium G400 16Mb	• Matrox Millennium G400 16Mb	• Matrox Millennium G400 16Mb
• Turtle Beach Montego II Audio	• Turtle Beach Montego II Audio	• Turtle Beach Montego II Audio	• Turtle Beach Montego II Audio
• 10X DVD-ROM Drive	• 10X DVD-Rom Drive	• 10X DVD-ROM Drive	• 10X DVD-ROM Drive
• 17" Colour Monitor	• 17" Colour Monitor	• 17" Colour Monitor	• 17" Colour Monitor
• Altec Lansing ACS45.1 Speakers	• Altec Lansing ACS45.1 Speakers	• Altec Lansing ACS45.1 Speakers	• Altec Lansing ACS45.1 Speakers
• ATX Mid Tower Case	• ATX Mid Tower Case	• ATX Mid Tower Case	• ATX Mid Tower Case
• 56K PCI V.90 Fax/Modem	• 56K PCI V.90 Fax/Modem	• 56K PCI V.90 Fax/Modem	• 56K PCI V.90 Fax/Modem
• Microsoft Intellimouse	• Microsoft Intellimouse	• Microsoft Intellimouse	• Microsoft Intellimouse
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• 64MB SDRAM	• 64MB SDRAM	• 64MB SDRAM	• 64MB SDRAM
• 10GB Ultra ATA Hard Drive	• 8.4GB Ultra ATA Hard Drive	• 10GB Ultra ATA Hard Drive	• 13GB Ultra ATA Hard Drive
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• Altec Lansing ACS22 Speakers	• Altec Lansing ACS22 Speakers	• Altec Lansing ACS22 Speakers	• Altec Lansing ACS22 Speakers
• ATX Mid Tower Case	• ATX Mid Tower Case	• ATX Mid Tower Case	• ATX Mid Tower Case
• 56K PCI V.90 Fax/Modem	• 56K PCI V.90 Fax/Modem	• 56K PCI V.90 Fax/Modem	• 56K PCI V.90 Fax/Modem
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Intel Processor	Mobile Celeron 400Mhz	Mobile Celeron 466Mhz	Mobile Celeron 466Mhz
Memory(std/max)	64MB/256MB SDRAM	64MB/256MB SDRAM	64MB/256MB SDRAM
Hard Drive	4.8GB	4.8GB	6.4GB
Display	13" HPA	14.1" Active TFT	14.1" Active TFT
S-Video (TV-out)	-	-	Yes
CD/DVD-ROM	24X MAX CD-ROM	24X MAX CD-ROM	4X DVD-ROM
Weight	3.4kg	3.5kg	3.5kg
Price	**$2855** NBIBM017 Rentsmart $27.50 per week*	**$4200** NBIBM018 Rentsmart $38.08 per week*	**$4200** NBIBM019 Rentsmart $43.38 per week*

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- 2x Serial, 1x Parallel, 2x USB Ports
- 2x EIDE Controller & ATX Form Factor
- Supports Wake on LAN, DMI, SB-LINK

Pentium III Ready



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- Supports PC133 133Mhz RAM
- 5x PCI, 2x ISA, 1x AGPx 2 Expansion slots
- 768MB SDRAM for 3x DIMM slots
- 2x Serial, 1x Parallel, 2x USB Ports
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133Mhz SYSTEM BUS READY

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- Audio Extraction
- MAX Transfer rate 7200 Kb/sec

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- Supports 200Mhz Front Side Bus
- 3 x 168 Pin slots to 768MB DRAM
- 2 x Ultra DMA 33/66 Ports
- Aureal AU8810 PCI Sound AC97
- 5 x PCI, 2x ISA (shared), 1 x AGPx2
- ATX Form Factor with USB

Athlon Ready **$345** MBGIG030

GA-BX2000



- Intel BX Chipset
- Supports Intel Pentium II/III Processor to 600Mhz and Celeron to 500Mhz
- Supports 66/100Mhz System Bus
- 4 x DIMM slots to 1GB DRAM
- 5 x PCI, 2x ISA, 1 x AGP Slots
- ATX Form Factor with USB

Dual BIOS™ **$225** MBGIG024

GA-5AX



- Ali Aladdin V Chipset
- Intel Pentium MMX, Cyrix to 333Mhz, AMD K6-2 / 3 to 500Mhz
- 512K L2 Cache
- 3 DIMM Slots to 768MB DRAM
- 2 x Ultra DMA 33 Ports & Serial/Parallel
- 5 x PCI, 1x ISA, 1 x AGPx4 Slots,
- ATX Form Factor with USB

$155 MBGIG025

Mainboards — ABIT

ABIT BE6 Mainboard

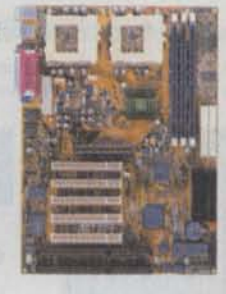


The latest offering from ABIT features the Intel BX chipset based Slot 1 Mainboard supporting the Ultra DMA/66 IDE protocol and SOFT MENU™ technology.

- Supports Intel Pentium II/III and Celeron to 600Mhz
- 3 x DIMM sockets to 768MB SDRAM
- 2 x UDMA33/66 IDE Ports, 2 x UDMA33 Ports
- 1 x AGP, 5 x PCI, 2 x ISA Ports
- Onboard Serial, Parallel, USB and I/O

$255 MBABI001 ULTRA 66

ABIT BP6 Dual Celeron Mainboard



ABIT announces the release of the World's First Dual Socket 370 motherboard, the BP6 doubly defies the limitations of Intel's BX chipset by offering both Dual Socket 370 CPUs and UDMA/66 IDE Ports satisfying even the most demanding users.

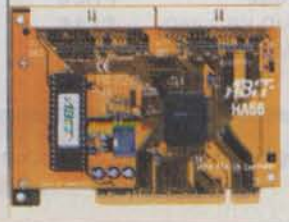
- Supports up to 2 x Celeron Processors to 500Mhz
- 3 x DIMM sockets to 768MB SDRAM
- 2 x UDMA33/66 IDE Ports, 2 x UDMA33 Ports
- 1 x AGP, 5 x PCI, 2 x ISA Ports
- Onboard Serial, Parallel, USB and I/O

$285 MBABI002 DUAL PROCESSOR

HotRod UDMA/66 PCI Accelerator

With the help of the ABIT Hot Rod 66 your mainboard can now support the new UDMA/66 specification. The new disc interface provides maximum disc performance using current PCI technology. Special 80-conductor cable is supplied reducing crosstalk and interference in addition to a simple plug and play installation process.

- UDMA/66 performance
- Simple installation
- Includes Cables



HOT

$99 MBABI003

SCSI — adaptec

ADAPTEC 2906 PCI CARD FOR DESKTOP PCS

Connect up to 7 SCSI devices and gain great performance by moving to SCSI with the Adaptec 2906. Run your ZIP drive or Scanner up to 6 times faster than with a parallel port connection. Adaptec EZ-SCSI Software is included to help you manage your peripherals.



$115 CCGEN021

ADAPTEC 2940U2W

Unleash the full potential of your server or workstation When it comes to boosting the performance of servers and workstations to 80Mb/s utilising Ultra2 SCSI (LVD) technology. By combining the Adaptec 2940U2W with high-performance disk drives you'll get performance worth howling about.



RETAIL KIT **$699** CCGEN018

OEM **$455** CCGEN022

ADAPTEC USBConnect 2000

Connect up to 7 SCSI devices to your PC, Notebook or Macintosh. USB Connect 2000 converts a USB port to SCSI in seconds without tedious time-consuming restarts.



NEW

$159 CCGEN026

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Processors

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Performance for the Home and Office Needs
Intel Celeron Processor



Get great performance for your personal computing and office needs with the Intel Celeron Processors. Intel Celeron processors give you quick, responsive performance for today's business applications and provide cost-effective managed client solutions for any environment.

NEW

Code	Model	Price
CPINT029	Celeron 433Mhz PPGA	$165
CPINT030	Celeron 466Mhz PPGA	$215
CPINT032	Celeron 500Mhz PPGA	$319
CPINT048	Celeron 533Mhz PPGA	$395

Ultimate Gaming and Multimedia
Intel Pentium III Processor



NEW

The new range of Intel Pentium III Processors feature 256Kb of **Advanced Transfer Cache** - a mechanism which matches the cache speed to the speed of the processor. Available in 100Mhz and 133Mhz front side bus speeds.

See page 6 & 7 for the new range of 133Mhz mainboards.

Code	Model	System Bus Frequency (Mhz)	L2 Cache Size (kb)	L2 Cache Type	Price
CPINT027	Pentium III 450	100Mhz	512	Discrete	$375
CPINT028	Pentium III 500	100Mhz	512	Discrete	$499
CPINT031	Pentium III 550	100Mhz	512	Discrete	$765
CPINT040	Pentium III 550E	100Mhz	256	ATC	$795
CPINT033	Pentium III 600	100Mhz	512	Discrete	$995
CPINT041	Pentium III 600E	100Mhz	256	ATC	$975
CPINT043	Pentium III 650	100Mhz	256	ATC	$1265
CPINT045	Pentium III 700	100Mhz	256	ATC	$1675
CPINT038	Pentium III 533B	133Mhz	512	Discrete	$710
CPINT047	Pentium III 533EB	133Mhz	256	ATC	$675
CPINT039	Pentium III 600B	133Mhz	512	Discrete	$995
CPINT042	Pentium III 600EB	133Mhz	256	ATC	$975
CPINT044	Pentium III 667	133Mhz	256	ATC	$1315
CPINT046	Pentium III 733	133Mhz	256	ATC	$1715

AMD

The AMD K6 II and K6 III range of socket 7 processors provide the power to run today's hottest games and multimedia software. The K6 III Processor provides extended performance via its enhanced 3DNOW! Technology and innovative tri-linear cache design.

Excellent performance for those on a budget.
AMD K6-2 Processors



Code	Model	Price
CPAMD018	AMD K6-2 450	$135
CPAMD019	AMD K6-2 500	$235

AMD K6-3 Processors



Code	Model	Price
CPAMD016	AMD K6-3 400	$235
CPAMD017	AMD K6-3 450	$325

Heatsink and Fan Socket 7 CPU Fan **$15** MSADE006



Memory

SDRAM

- 64-bit, 168 Pin DIMM Memory
- 100Mhz Speed
- For use with AMD K6-2/3 & Athlon, Pentium II/III and Celeron Processors
- Compatible with VIA, Intel TX, LX, BX, ZX Chipsets

Code	Model	Price
RAGEN024	32MB PC100 SDRAM	$109
RAGEN022	64MB PC100 SDRAM	$179
RAGEN023	128MB PC100 SDRAM	$349
RAGEN025	256MB PC100 SDRAM	$Call

ECC SDRAM

- Provides error checking and correction for mission critical servers and workstations.



Code	Model	Price
RAGEN026	128MB ECC SDRAM	$Call
RAGEN027	256MB ECC PC100 SDRAM	$Call

EDO RAM

- 32-bit Memory
- Use with 486 and older Pentium systems
- Used in Pairs in Pentium Systems



Code	Model	Price
RAGEN005	16MB EDO SIMM 72Pin	$79
RAGEN006	32MB EDO SIMM 72Pin	$145

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Sydney NSW 2000
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Sporting the industry's first **Ultra ATA/66** high speed data transfer feature, the new Caviar drives feature a maximum transfer rate of 66Mb/s. That's double the speed of its nearest rival. All Western Digital Caviar drives undergo 200 rigorous tests before shipping to ensure compatibility and reliability with all your existing hardware and software applications.

Desktop EIDE Drives

NEW

The WD Caviar family is the ideal solution for desktop personal computers and provides the best combination of performance and value for entry-level to mainstream PCs.

Code	Size (GB)*	Seek	RPM	Cache	Price
HDWES004	8.4GB	9.5ms	5400	2MB	$250
HDWES005	10.2GB	9.5ms	5400	2MB	$265
HDWES006	13.6GB	9.5ms	5400	2MB	$295
HDWES007	20.5GB	9.5ms	5400	2MB	$360

Performance EIDE Drives

NEW

PRICE DROP

Designed for high-end desktop PCs and single user workstations, WD Expert drives outperform ordinary EIDE and even low-end SCSI solutions with average speeds 20 percent fast than conventional 5400 RPM EIDE drives.

Code	Size (GB)*	Seek	RPM	Cache	Price
HDWES008	9.1GB	9ms	7200	2MB	$295
HDWES009	18GB	9ms	7200	2MB	$425



Data Lifeguard

The Data Lifeguard feature is in every Western Digital hard drive. Data Lifeguard protects end user data by automatically detecting, isolating and repairing possible problem areas before data loss can occur.

ATA 66 READY

* 1Gb = 1 Billion bytes

Power Protection

PK

Protecting your Computer and peripherals.



BlackoutBuster (500 VA)

Is a UPS that has all the features to satisfy all your needs.Protects a standard PC for up to 25 mins.

$285
PSPKE000



Add the

Powerpack

For increasing the power capacitor backup time of the system.
One powerpack doubles the BlackoutBusters power. Doubles backup time to 50 mins.

$270
PSPKE003



Smartpack

Adding Smartpack allows BlackoutBuster to be monitored and controlled by a computer.

$165
PSPKE001

Code	Model	Price
PSPKE000	Blackout Buster 500VA	$285
PSPKE001	Smartpack	$165
PSPKE002	Micropack	$65
PSPKE003	Powerpack 500VA	$270
PSPKE004	Blackout Buster 1000VA with Smartpack	$690



MicroPack

This is an attachment for auto matic shutdown of Windows, OS/2 and Novell netware operating systems.

$65
PSPKE002

Emergency backup battery

Voltage protection

Power Surge protection

Internet line protection

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Quantum®

Quantum Fireball™ Plus KX

Blazing performance and reliability for the desktop or workstation

The Fireball Plus KX features the revolutionary Quantum Data Protection System and Shock Protection System. Combined, these two systems help eliminate the major causes of disk drive returns-and give customers an unprecedented level of confidence that their data will be preserved.

- 8.5ms Access Time
- 7200 RPM Spindle
- Ultra ATA/66 Interface

Code	Capacity	Price
HDQTM061	13.6GB	$310
HDQTM062	20.5GB	$425
HDQTM063	27.3GB	$565



Quantum Fireball™ LCt

Intelligently Priced Leading-Edge Performance

Featuring an 9.5 ms seek time, a 512 kilobyte (KB) buffer, and a 5,400 RPM rotational speed, Fireball lct hard drives deliver the performance needed for the most demanding home and small-business applications. To ensure optimum throughput, Fireball lct drives feature the Quantum-developed, high-performance Ultra ATA/66 interface, which virtually doubles the burst data rate.

VALUE

Code	Capacity	Price
HDQTM064	4.3GB	$205
HDQTM065	8.5GB	$240
HDQTM066	13GB	$275
HDQTM067	17.3GB	$325

IBM®

Deskstar Performance IDE Drives

The IBM Deskstar family of hard disk drives delivers high-performance, reliable desktop data storage in an ATA/IDE interface with industry-leading capacity points for today's cutting-edge applications. Deskstar drives features Ultra ATA/66 interfaces with 512Kb cache for 5400RPM drives & 2MB cache for 7200RPM drives.



Code	Capacity	Spindle (RPM)	Access Time	Price
HDIBM039	15.2GB	5400	9.5ms	$295
HDIBM040	20.3GB	5400	9.5ms	$385
HDIBM041	9.1GB	7200	9.0 ms	$269
HDIBM042	13.5GB	7200	9.0 ms	$315
HDIBM043	18GB	7200	9.0 ms	$435
HDIBM044	22GB	7200	9.0 ms	$495
HDIBM045	27.3GB	7200	8.5 ms	$565

TravelStar 2.5" IDE Drives

Experience blistering performance on a notebook computer. The IBM range of TravelStar IDE drives feature 512K of cache accessed via an Ultra ATA interface. Compatible with most notebook & laptop computers.



Code	Model	Capacity	Height	Price
HDIBM036	12GN	6GB	9.5 mm	$470
HDIBM037	12GN	9GB	9.5 mm	$685
HDIBM038	12GN	12GB	9.5 mm	$765

Seagate

High performance disk solutions from Seagate catering for:

- High end multimedia & video applications (A/V)
- Graphics and 3D Applications
- Internet/Intranet based webservers
- High performance workstations, servers and super computers





Seagate Barracuda

High Capacity, ultra SCSI 2 Hard Drives with a spindle speed of 7200RPM.

Code	Model	Capacity	Access Time	Interface	Price
HDSGT041	ST39175LC	9.1GB	6.9 ms	80 Pin	$645
HDSGT042	ST39175LW	9.1GB	6.9 ms	68 Pin	$645
HDSGT028	ST39173LW	9.1GB	8 ms	68 Pin LVD	$665
HDSGT043	ST318275LC	18.2GB	6.9 ms	80 Pin	$995
HDSGT044	ST318275LW	18.2GB	6.9 ms	68 Pin	$995

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www.diamondmm.com

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Viper II

Who Said Anything About Playing Fair?



NEW

Give yourself an unrivaled games advantage. The Viper II graphics card is equipped with 4X AGP power and a transformation and lighting engine for the most realistic images ever. Features include 32MB of high-speed memory, 128-bit acceleration, and S3TC texture compression, hurling 15 million triangles at your monitor every second for the most intense 3D action ever.

Viper II 32MB

$399

DCDIA032

Also available in the Viper performance family

Code	Model	Price
DCDIA026	V770 Ultra 32MB	$365
DCDIA027	V770 32MB	$289
DCDIA028	V770 16MB	$215

Monster Sound MX400

UP YOUR AUDIO!

Diamond's Monster Sound MX400 delivers PC audio hardware acceleration for hardcore PC gamers and digital audio enthusiasts. Add the Rio PC upgrade for hardware accelerated MP3 playback, ripping and FM tuner for a whole new twist for your PC audio experience.

- Advanced positional audio technology
- Scorching 3D sound with TRUE quad output
- Dolby Digital for PC home theatre



NEW

$165 MMDIA026

Steath III

Xtreme gaming has arrived!

Steath III S540 Xtreme delivers robust 2D/3D features and speedy performance at an unbelievable price. Based on the S3 Savage4 Xtreme chipset and featuring S3TC texture compression, integrated advanced 3D quality features include 128-bit processing, 32MB of memory, up to AGP 4X support, a 32-bit 3D rendering pipeline and massive texture processing, Stealth III S540 Xtreme delivers stunning visual quality at blazing speeds for the hottest 3D games.



PCI NOW AVAILABLE

32MB PCI	32MB AGP OEM	Xtreme
$195	**$225**	**$265**
DCDIA031	DCDIA023	DCDIA030

Supra Express 56e

Award-Winning Preformance

Diamond's SupraExpress 56e is a powerful external modem. Designed to deliver award-winning 56K performance over a wide variety of line conditions, the SupraExpress gives you faster and more dependable Internet access. Offering incredible value, it is packaged with everything you need for fax, Internet and voicemail.

- 56K ITU Standard
- 230Kbps throughput
- External reset switch

NEW



$149 FMDIA000

Rio 500

The Whole World is listening

The Rio 500 puts the power of digital audio in the palm of your hand! Rio 500 is skip-free, portable audio player that hold up to two hours of digital quality music and up to 32 hours of spoken audio content. Rio is the perfect companion for people on the go.

- 64MB built-in memory - Expandable to 96MB
- Back-lit LCD display with preset & custom EQ functions
- 13 hours continuous playback with single AA Battery

HOT



$525 MMDIA015

32MB Flash Memory Card **$199** MMDIA016

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matrox

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The Millennium G400 Series

A powerhouse of breakthrough technologies and next-generation features, the Millennium G400 Series of graphics boards are outfitted with Matrox's unique DualHead Display feature, built-in support for true Microsoft® DirectX™ 6 Environment-Mapped Bump Mapping and trademark Vibrant Color Quality² rendering. It is these unequaled, must-have features which not only distinguish them from all other graphics solutions, but which revolutionizes the way you use computers.

The Millennium G400

Fitted with 16 or 32MB of fixed, high-speed SGRAM, the Millennium G400 provides lightning fast, ultra-crisp displays with its 300 MHz RAMDAC, while at the same time delivering stunningly realistic image quality in the most demanding business and home applications without compromising performance.

G400 RETAIL 16MB	G400 RETAIL 32MB	G400 16MB OEM	G400 32MB OEM
$329 DCMAT033	$415 DCMAT034	$285 DCMAT036	$380 DCMAT037

The Millennium G400 MAX

The Millennium G400 MAX is fitted with a fixed 32MB of high-bandwidth SGRAM and is supercharged with a 360 MHz UltraSharp RAMDAC capable of driving high-end monitors at resolutions of up to 2048 x 1536, 32-bpp at 85Hz. Targeted directly at the accept-no-compromise PC gamer and at professionals who require an exceptionally large desktop display, the Millennium G400 MAX slams the performance gear into overdrive with an increase in raw speed of more than 30 per cent over the Millennium G400.

G400 MAX 32MB AGP $525 DCMAT035

Sound Cards



Montego II QUADZILLA

The total 3D gaming experience!

The gamer's choice for the best in 3D audio just got better. Introducing the new montego II Quadzilla from Turtle Beach. Armed with the very latest Wavetracing™ technology, Quadzilla submerses you in the astounding 3D audio world of the hottest new games and websites with realistic three-dimensional audio images. And with stereo S/PDIF digital output, you get the best theater quality surround sound for your PC.

- A3D 2.0 positional audio with four speaker support and S/PDIF digital output
- High-quality audio performance with 97 dB signal-to-noise ratio
- 320 voice PCI wavetable synthesis
- Includes Voyetra Software Suite





A3D Quadraphonic



$329 MMTUR002

Montego II

With advanced features such as high-speed bus-mastering scatter-gather PCI audio interface, DirectSound acceleration, 320 voice wavetable synthesis, A3D positional audio for realistic gaming effects, hardware-based, full-duplex record/playback at full bandwidth and 96 DMA channels, Montego II maximizes your multimedia experience by delivering state-of-the art audio performance! Montego II also runs legacy DOS games,* so you can supercharge Windows audio without giving up DOS games compatibility

- High-resolution, 18-bit converters
- 10 Band Hardware Equalizer
- Greater than 97 dB signal to noise ratio
- Supports all of the latest PC audio standards
- Experience the thrill of Aureal A3D
- Internet-ready with enhanced stereo full-duplex audio



$159 MMTUR004

PC GAMES COMPATIBLE · HARDWARE FULL DUPLEX ENHANCED · INTERNET READY · GENERAL MIDI · Voyetra

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Fax: (02) 9267 5042

Magic TNT2

The Magic TNT2 using the nVIDIA RIVA TNT2 chipset is the fastest and meanest gaming card on the market today. Featuring a 300Mhz RAMDAC, the Magic TNT2 supports resolutions up to 2048 x 1536 with ease. Loaded with 32MB of ultra quick SGRAM the Magic TNT2 offers complete support of 3D textures and is optimized for Pentium III and AMD 3DNow systems.



AGP + TV Out **$275** DCMAG018

Ultra + TV Out **$315** DCMAG023

Magic TNT2 M64

The Magic M64 utilising the nVIDIA TNT2 128-bit chipset features award winning performance at a competitive price. Featuring 32MB of SDRAM and a 300Mhz RAMDAC for crystal clear resolution, the M64 is ideal for graphics, hardcore gaming and watching DVD action in full screen mode.



$179 DCMAG020

4Mb S3 AGP Card **$45** DCMAG005

8Mb AGP Graphics Card + TV Output **$85** DCMAG022

NEW

Magic 3D Banshee

The Magic TwinPower incorporating the latest 3DFX Voodoo Banshee chipset is one of the fastest and most amazingly fast 2D/3D Graphics Accelerator on the market today. Play games at up to 60 fps and run high resolution games/ applications at up to 1600 x 1200 with hardware acceleration.



- 128-bit combined 2D/3D Voodoo Banshee chipset
- 16MB Memory with 125Mhz SGRAM
- Supports Glide, OpenGL, DirectX, Direct3D
- NT 4.0 & Windows 95/98 compatible

PCI **$159** DCMAG001

AGP **$159** DCMAG0002

Magic TV

Watch full screen TV on your PC with the FlyVideo TV Card. Capture live video & images from your VCR or Camcorder, or use a CCD Camera and video-conference over a LAN or Internet. Teletext included with FM radio.



TV Card/Remote/FM Radio **$135** MMMAG002

Magic Toplan

TopLan is a USB to USB Host connector allowing two or more computers to share programs, files and peripherals such as printers with ease. Multiple network nodes supported to a super-fast 12Mbps under Network Neighborhood in Windows 98. Simple PnP installation ideal for multi-player gamers & those with more than one computer. Pack includes a TopLan Host and 2 x 1.8m USB cables.



$125 NWMAG000

Magic Link



Simple, portable and fast link for transfering files between 2 USB-enabled computers. A must for notebook & mobile users. Software & 6ft cable included.

$55 NWMAG001

See Page 31 for a great range of USB products

Magic Theater Pro

Magic Theater Pro 5.1 Channel system will deliver Hi-Fi and true Dolby Digital AC-3 sound on your PC with today's games and movie titles. Comes complete with a Magic Sound Live! PCI soundcard and a speaker system consisting of a subwoofer, 4 satellites and a center channel delivering a total of 47 Watts RMS.



$379 MMMAG003

Magic TrueSound

Magic TrueSound brings together requirements demanded by musicians, gamers and midi players. Allowing them to enjoy the high quality environmental sound. Featuring the JRC TrueSurround 3D audio processor. It produces exceptional sound experience from multi-channel audio such as Dolby Digital through only two speakers.



$65 MMMAG005

Swann

Let Swann cater to all your modem needs.

Whether you use it for gaming, email, working or online transactions we have the modem just for you



netSLIDER 56K V.90

The faster your modem, the faster your commands are received and processed by an on-line server, putting you ahead of your on-line competition. The Swann Netslider's ISO 9901 Rockwell chipset guarantees to deliver exceptionally stable as well as fast data transmission. Finally a modem that is catered just for gamers.



$179 FMSWA005

Swann Smart 56K



Simplicity and stability are what made this modem win a 'best buy' award against 17 leading-brand modems tested. The Swann Smart 56K External Modem's clever upright design, not only takes up less desk space, but defies heat, the enemy of all modems. Perfect for the family and new computer user and those new to the internet.



BONUS OFFICE WEBWORKS

Internal **$89** FMSWA001

External **$179** FMSWA000

Speed Demon 56K

Red hot and roaring to go! The Speed Demon 56k modem offers blinding speed and reliability. With dual chip v.90/k56 Flex technology, it's fax, data and voice compatible. Simple to install and easy to use, this modem will take you on the w...w...wildest ride.



$129 FMSWA004

Swann Smart 56K Global PC Card



Use in 27 Countries

$195 FMSWA002

SwannSmart International 56K modem cards lets you travel virtually anywhere in the world with your notebook or Palm™ personal assistant and never lose touch. In fact all your usual business and personal communication tasks need never be curtailed, just because you're overseas.

Swannsmart Firewire 3 Port PCI



Simply plug this PCI card into your windows 98 computer for instant firewire capability. This card gives you 3 Firewire ports at a full 400Mbps. This card allows you to connect up the latest DV cameras and new high speed firewire hard drives. All of this for cheaper than you can get the latest in SCSI technology.

NEW

$329 CCSWA000

Swannsmart USB 4 Port Hub



Run out of USB ports?....Don't worry. Simply connect a Swannsmart hub and connect up to 4 more USB devices. This little unit require no external power source yet it can produce extra power for your devices via it's unique powerup switch.

NEW

$45 DSSWA000

NetComm

U.S. Robotics

Netcomm Roadster II Ultra 56K

This modem features Simultaneous Voice Data, which means you can send data and voice through the one line. Great for gamers as well as the business user, this modem features V90 as well as K56 flex protocols. Comes in either the new advanced USB interface or the traditional serial interface.



INCLUDES WINFAX PRO 8.0

USB **$235** FMROB015

Serial **$235** FMROB012

3Com 56K Message Modem Pro

All the features of a top brand Voice/Fax Modem and more. This unit allows superfast internet access with either V90 of X2 systems. Experience office quality full duplex hands free speakerphone with this modem, even feature Caller ID too. You can even store voice/fax messages when you PC is switched off.



$275 FMROB012

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Adelong Computers

Dynalink

With all Dynalink modems:

6 MONTHS FREE INTERNET ACCESS With TPG

***PLUS:* ValuePack software offer: IPhone 5 FREE, Norton Utilities 3 $20, Compton's Infopedia $15, Quake II $10 with your purchase of any Dynalink product.**

SIX MONTHS OF FREE INTERNET HOURS WITH TPG IS AVAILABLE IN: SYDNEY, PENRITH, KIAMA/WOLLONGONG, LAKE MACQUARIE, MELBOURNE, BRISBANE, SOUTHPORT, CANBERRA, ADELAIDE, PERTH, HOBART, LAUNCESTON AND DARWIN. ONE OFF $39.95 CONNECTION FEE. 300MB DOWNLOAD LIMIT PER MONTH. UNLIMITED 3 HOUR CONNECTIONS. OFFER AVAILABLE FOR A LIMITED TIME.

Dynalink 56k External Modem



5 YEAR WARRANTY

- V.90 / K56flex dual-mode for high Internet compatibility
- Plug 'n play, plus friendly QuickGuide for easy installation.
- Send and Receive faxes with high speed and clarity from your PC.
- FaxStream DUET, Caller ID, Voice Mail, Handsfree Speakerphone Mode.
- Free-call Tech Support

"Good value for money... ease of setup and use is excellent... consistently connects at high speeds"
Australian PC World, Nov 1999.

VoiceDesk56 Pro External **$145** FMDYN001

Dynalink Internal ISA or PCI

ISA has all the features of our external.
PCI:

- PnP installation
- Telephone Answering Machine Mode
- V.90 / K56flex dual-mode for high Internet compatibility
- Send and Receive faxes with high speed and clarity from your PC.
- Free-call Tech Support
- 1 Year warranty on PCI

5 YEAR WARRANTY ON ISA



VoiceCard56 ISA **$129** FMDYN000

PCI Card56 **$85** FMDYN005

Dynalink USB Modem



5 YEAR WARRANTY

- Super-easy Installation.
- Free up Slots and IRQs.
- No Power Supply, No Messy Cables.
- Dual-mode V.90, Fax Machine, Answer Machine.

$179 FMDYN006

Also Available 56k PCMCIA
$199 FMDYN007

Dynalink Magic Xpress TView



TVIEW TV/FM TUNER VIDEO CAPTURE CARD

- Fully Featured, including Teletext, Remote Control & FM Tuner
- Resizable window, right up to full-screen (640x480), using the Remote Control.
- Capture incoming video from a VCR, digital camera or CamCorder, then edit the captured digital data.

ALSO AVAILABLE: USB DEVICES AND 3D GRAPHIC ACCELERATORS

$149 MMDYN002

For more information on any of Dynalink's products, please visit www.dynalink.com.au or FreeCall 1800-357-653

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ORB™

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INTERNAL AND EXTERNAL

Size. Speed. For everyone.
Easy to install Unlimited Capacity
Infinitely Rewritable



SCSI NOW AVAILABLE

STATE-OF-THE-ART TECHNOLOGY MR

Look at the power ORB delivers!

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- *2+ hours of video*
- *2,000+ colour photographs*
- *22 100MB floppy disks*
- *SCSI, EIDE or Parallel Port versions*
- *1500+ 1.44MB floppy disks*
- *3+ CD ROM games*

Call for latest pricing

CASTLEWOOD

BUORB000	2.2Gb Internal EIDE ORB Drive	$399
BUORB005	2.2Gb ORB Disk	$79
BUORB001	2.2Gb External Parallel ORB Drive	$449
BUORB003	2.2Gb External SCSI ORB Drive	$449

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ADELONG australia

RICOH

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MP8040SE

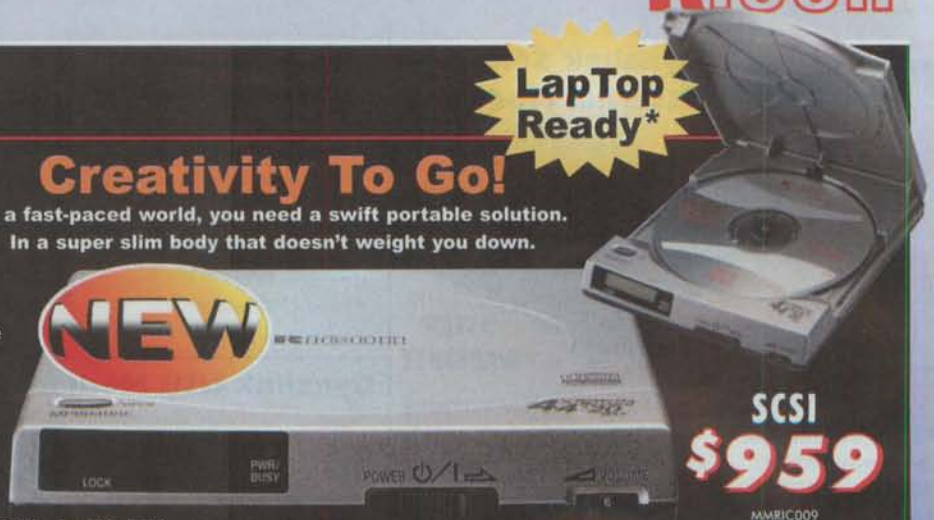
Portable CD-R/RW Drive

4x Record 4x ReWrite 20x Read

LapTop Ready*

Creativity To Go!

In a fast-paced world, you need a swift portable solution. In a super slim body that doesn't weight you down.



Finally, all the benefits of Ricoh technology are available in a portable CD-R/RW drive. Compact and lightweight, the MP8040SE offers the same pickup module. Whether you're creating multimedia or storing business data, reach for Ricoh, the leader in CD-R/RW technology.

BUFFER MEMORY	**2MB**
WRITING/READING SPEED	**Writing: 4x (CD-R), 4x (CD-RW) Reading: Max. 20x (CAV)**
AVERAGE ACCESS TIME	**Less than 150msec. (20x)**

SCSI $959 MMRIC009

*Subject to lap top platform

MP9060A SERIES

All Your CD Business needs ...PLUS DVD Entertainment

CD-R/RW Drive & DVD-ROM Drive

6x Record 4x ReWrite 24x Read & 4x DVD Read

HOT & NEW

FOUR-IN-ONE POWER!

The standard for recording and storage media, CD-R/RW, and the new standard for movies and multimedia software, DVD, are together in one unit. It begins with the convenience of CD-R/RW technology, like fast backups and original CD mastering. And it continues with DVDs that deliver high-impact movies right to your desktop. Rico's MP9060A responds to your needs for an allaround media soloution.



SCSI $699 MMRIC010

BUFFER MEMORY	**2MB**
WRITING/READING SPEED	**Writing: 6x (CD-R), 4x (CD-RW) Reading: 24xMax (CD-RW/CD-R/CD-ROM), 4x (DVD-R)**
AVERAGE ACCESS TIME	**120msec. (CD-RW/CD-R/CD-ROM) 200MSEC (DVD-ROM)**

MP7060 SERIES

When every second counts...

CD-R/RW Drive

Accelerated in every way. The birth of a new high-speed CD.R/R Drive.

Write CD-R 6x ReWrite CD-RW 4x Read 24x



Horizontal & Vertical installation possible.

The MP7060 Series offers further advances in reading/write speed. Ricoh's MP7060 Series CD-R/RW drives feature 6x CD-R recording speed, 4x CD-RW rewriting speed, and up to 24x CD-ROM/CD-RW disc reading speed. High-speed access makes CD-RW the ideal medium for daily data backup.



EIDE $525 MMRIC007

SCSI $635 MMRIC008

BUFFER MEMORY	**2MB**
WRITING/READING SPEED	**Writing: 6x (CD-R), 4x (CD-RW) Reading: Max. 24x (CAV)**
AVERAGE ACCESS TIME	**Less than 120msec. (24x)**
INSTALLATION	**(Vertical with eject button on top) Horizontal**



RICOH

CD-R Type 74 Lite Jackets 10 pack 74 Mins 650Mb

$25 MMRIC011

FORMATTED MEDIA



(1x4x)CD-RW Disc 74 Mins 650Mb

$16 MMRIC003



Ricoh CD-R Disc 74 Mins 650Mb

$3 MMRIC004



CD-R Disc 74 Mins 650Mb 1x 8x Speed

$27 MMRIC012

80Min 700Mb 12x 5 pack $15 MMRIC013

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Verbatim

Smart and Friendly

CD-RW/CD-R/DVD

CD Pocket RW 4x4x20

INCLUDES EASY CD CREATOR, SCALA MM200 & OTHER SOFTWARE TO THE VALUE OF $2018



The Smart and Friendly CD Pocket RW from Verbatim is a truly portable 4X Write, 4X ReWrite and 20X Playback CD Recorder with a 2MB Buffer. Weighing just 500 grams, the CD Pocket RW is designed specifically for portability. Rechargeable battery pack is designed to write up to 6 CD's at 4X Speed without recharging. Comes with software and a PCMCIA host adaptor.

NEW

$1325 MMVER009

CD SpeedWriter RW

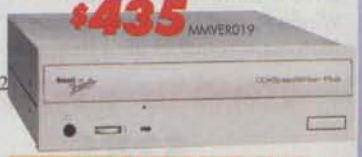
4x Write, 4x ReWrite, 24x Read Internal IDE

INCLUDES FREE SOFTWARE VALUED AT OVER $1400

The Smart and Friendly CD SpeedWriter RW is a 4x write, 4x ReWrite, 24x Playback CD-Recorder with a plentiful 2MB buffer, capable of creating a full 650MB CD in as little as 17 minutes. It is ideal for music and audio storage, data archiving and backup, disaster recovery, digital imaging and a whole range of multimedia applications.

Software suite includes:
- Adaptec Easy CD Creator standard
- Powerquest Drive Image
- Diamond Cut Audio Restoration Tools 32
- Sonic Foundry CD Architect
- Sonic Foundry Sound Forge XP
- MediaPath CD-Quickshare
- ECI Disc Inspector Pro

+ bonus Scala



$435 MMVER019

External SCSI Also Available 4x,2x,24, **$795** MMVER020

CD-RW Discs



$7 MMVER004

CD-R

Pack of 10



$25 MMVER000

DVD-RAM Discs

2.6GB **$75** MMVER012

5.2GB **$109** MMVER013



CD-R Discs

80 Min CD-R



$3 MMVER014

20x PCMCIA CD-ROM Drives

Connect a 20X CD-ROM Drive to your notebook PC today via the PCMCIA port. The slim-line tray design reduces the size of the unit making it portable and lightweight.

DVD Version Also Available



Code	Model	Price
MMVER008	CD ROM	$285
MMVER015	DVD ROM	$759

$285 MMVER008

Signature II CD Colour Printer



The Signature II CD Colour Printer from Verbatim and Primera makes CD-R labelling easy. With Signature II's high-resolution printing, you can add crisp, colourful text, logos, graphics and photos to your CD-Rs.

NEW

$1745 MMVER006

Signature III Also Available

Code	Model	Price
MMVER016	Signature III	$2622

CopySmart 4x 4x 32x CD Duplicator



As easy to use as a photocopier!

Stand-alone or PC/MAC connected one-to-one duplicator able to record to both CD-R and CD-RW media.
4x CD-R, 4x CD-RW copy functions.
Simple 4 button interface allowing Speed selection, Test, Copy, Compare and Quick Erase.
PC based Data and Audio copying Software included.

$1995 MMVER005

DVD-ROM Upgrade Kit

DVD entertainment is now affordable with the Hitachi dual speed DVD-ROM Drive and Cinemaster MPEG Decoder Card, bringing the movies to your PC screen. Includes several DVD titles - Muppet Treasure Island, Spycraft, Daedalus Encounter, Wing Commander IV



$295 MMVER011

HOT

DVD-RAM Kit

Have up to 5.2GB of rewritable storage capacity at your fingertips with the latest in DVD-RAM technology. Features 1 x DVD-RAM Write and Erase, 2x DVD-ROM/RAM playback and 8 x CDROM playback speeds in a SCSI Internal model. In addition is a bundled MPEG-2 Cinemaster DVD playback card.



$1449 MMVER017

Code	Model	Price
MMVER018	DVD Bare Drive	$1299
MMVER017	DVD RAM Kit	$1449

Code	Model	Price
MMVER012	2.6GB Disk	$75
MMVER013	5.2GB Disk	$109

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iomega

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Zip 250 USB



All the benfits of the Zip 250 plus all the advanced features of the USB technology. True hot plugging technology and super fast USB connection. The new drive is compatible with both Windows and Macintosh, it also features a compact ultra thin case.

$345 BUIOM040

250MB Zip + PCMCIA Bundel

$385 BUIOM043



Zip 250

zip 250

SuperFloppy Preferred By Millions
The new drive comes in two flavors: parallel port (for PC's) and SCSI (for Mac's or PC's with a SCSI connection). Zip 250 SCSI drive users will benefit from a performance boost, up to 56 times faster than standard floppy drives and 1.4 times faster than external CD-ROM drives. Best of all, current Zip 100 drive users need not worry about their investment in 100MB Zip using 250MB media).

- 50% faster than the original Zip 100 drive.
- Large 250Mb Capacity
- Compatible with 100Mb Zip Disk
- Proven Reliability



BUIOM033	PARALLEL	**$299**
BUIOM032	SCSI	**$299**
BUIOM044	Internal IDE	**$299**

Clik! PC Card

clik! 40

This new Clik!™ drive is the size of a PC Card. Just slide it into your PCMCIA slot and have the benefits of super fast 40Mb storage that the Clik technology provides. Perfect for your digital pictures or large multimedia files.



$380 BUIOM041

Clik!

clik! 40

Clik!™ drive can store 40Mb of data on a Clik! Disk. The Click Drive not only reads your Clik! Disk but also your Compact Flash and Smartmedia cards. The Mobile Clik! Drive connects to your printer port using a pass through technology and can run on rechargable batteries for mobile applications. There is even a Type II PC Card that will connect your Clik! Drive up to your notebook. (Clik Drive Plus)



BUIOM035	Clik Drive	**$455**
BUIOM036	Clik Drive Plus	**$535**
BUIOM045	PC Clik Drive	**$365**

Zip Drives

Increase your storage quickly, easily and economically - as you need it. With a 100MB Zip Drive you can take your data anywhere at anytime. Each disk stores 100MB of data and you can add them, as your needs grow. Available in Parallel, SCSI, Internal IDE and the new USB interface. You also get Zip tools on CD.

IDE ATAPI $145 BUIOM007

Ext. Parallel $199



Drives

BUIOM000	100MB EXT PARALLEL ZIP Drive	**$199**
BUIOM026	100MB USB ZIP Drive	**$240**

Jaz 2GB Drive

jaz 2GB

The new Jaz Drives hold a whopping 2GB of data per disk. Best of all these drives are fast and backwards compatible with the industry standard 1GB disk. Stream & capture video, backup data and store images are just some of the applications that the Jaz Drive can be used for. SCSI Card needed.



INTERNAL $645 BUIOM017

EXTERNAL $645 BUIOM018

Zip CD

The internal Zip CD drive is a great way to archive data and software at a low cost. ZipCD drives is capable of reading and writing CDR as well as CDRW disc. This 4x recording, 4x rewriting and 24x reading drive is one fo the best performers on the market. Trust your archiving to Iomega the archiving specialist.



INTERNAL $375 BUIOM042

Accessories for Zip

BUIOM012	100MB PC ZIP Disk	**$24**
BUIOM005	100MB PC ZIP Disk (3 Pack)	**$63**
BUIOM006	100MB PC ZIP Disk (10 Pack)	**$190**
BUIOM022	ZIP Card, PCMCIA to SCSI	**$185**



$24 BUIOM012

Accessories for Jaz

BUIOM024	JAZ 2GB Disk	**$195**
BUIOM025	JAZ 2GB Disk (3 Pack)	**$559**
BUIOM031	JAZ PCMCIA to SCSI Converter	**$215**
BUIOM013	JAZ Traveller, SCSI to Parallel	**$85**

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Model	15"DD-556BA	17"DC-770BA	17"DE-770FA	19" DA-995
Screen Size	13.8" Viewable	16" Viewable	16" Viewable	18"Viewable
Dot Pitch	0.28mm	0.27mm	0.25mm	0.25mm
Max Resolution	1024x768 N/I	1280 x 1024 N/I	1280 x 1024 N/I	1600 x 1200 N/I
User Control	OSD	OSD	OSD	OSD
Price	**$275** MOVID003	**$425** MOVID000	**$485** MOVID002	**$875** MOVID001

3 YEAR ON SITE WARRANTY*

*QUEENSLAND, NSW, VICTORIA ONLY



Adelong Computers

Monitors/CD-R

Panasonic

PanaSync S110

Combining value with high quality imaging, the Panasync S110 is an excellent buy for a 21" monitor. It has all the features expected in a high end monitor all at a very reasonable price. If you are looking for good value uncompromised monitor performance then the Panasync S110 is perfect for you .





21" CRT, 20" viewable
0.25mm dot pitch
1600x1280 @ 75Hz

$1795 MOPAN001

PanaSync SL

The Panasync SL range of monitors feature the unique Short Length Technology. This technology give a Panasync SL 17" monitor the depth of a normal 14" monitor and the 19" Panasync SL the depth of a 15". The shorter depth of the ZenTan™ CRT reduces the distance between electron beam gun and the screen's phosphor surface thus enhancing picture quality



PanaSync SL75
17" CRT, 16" viewable
0.27mm dot pitch
1280x1024 @ 66Hz

$715 MOPAN015

PanaSync SL95
19" CRT, 18" viewable
0.25mm dot pitch
1600x1200 @ 75Hz

$1245 MOPAN011

PanaSync PL70i

Designed for professionals who demand the best in display quality. The 17" PL70i offers high refresh rates, unparalleled sharpness and clarity. Capable of refresh rates of 75Hz at resolutions up to 1280 x 1024. Using Zentan CRT technology the PL70i only occupies the monitor depth of a 14" monitor without sacrificing performance.



17" CRT, 16" viewable
0.25mm dot pitch
1280x1024 @ 75Hz

$830 MOPAN009

CD-ROM/CD-RW Drives

DELTA

Delta 48x CD-ROM Drive

One of the fastest and most reliable CD-ROM drives on the market. This new range of IDE CD drives from Delta represent the best value for money. Supports reading of CD-R, CD-RW and other media.



$85 MMDEL003

Code	Model	Price
MMDEL000	CD-Rom44x(OEM only)	**$75**

Delta CD-RW Drive 4x4x20

Looking for the latest CD ReWriting technology at a great price then look no further than the Delta 4x record, 4x rewrite and 20x read IDE CDRW drive. This is the best value kit on the market with all software and hardware needed to start recording straight away. One blank CDR and CDRW included with kit.



$349 MMDEL001

CD-Recording Kit

Want no frills high speed SCSI recording performance then look no further than this bundle. It includes the new 8x record, 20x read internal SCSI drive, a PCI SCSI card and recording software. Panasonic reliability and 8x recording performance but only at a 4x price.

$540 MMPAN007

Drive only
$450 MMPAN008





DELTA CD-R 10 pack Silver Discs
$19 MMDEL002

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MITSUBISHI ELECTRIC
EXCELLENCE THROUGH INNOVATION

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AUSTRALIA WIDE 3 YEAR ON SITE WARRANTY*

NEW RANGE OF MITSUBISHI MONITORS

Mitsubishi Diamond View 1554i 15"



- 15" Monitor ideal for home users
- Dynamic Focus picture tube
- 13.9" Viewable, 0.28 dot pitch
- Max Resolution 1024 x 768 @65Hz
- Weighs 13kg

$295 MOMIT009

Mitsubishi Diamond View 1570 15"



- 15" Monitor ideal for SOHOs
- Dynamic Focus picture tube
- 13.9" Viewable, 0.28mm dot pitch
- Max Resolution 1280 x 1024 @60Hz
- Weighs 13kg with OSD

$345 MOMIT010

Mitsubishi Diamond View 1770e 17"



- 17" Monitor for casual users
- High Contrast CRT
- 15.9" Viewable, 0.27mm dot pitch
- Max Resolution 1280 x 1024 @60Hz
- Weighs 18kg with OSD

$495 MOMIT012

Mitsubishi Diamond View 1795DT 17"



- 17" Monitor for demanding users
- **Flat, Diamondtron Tube**
- Apperture Grille
- 16" Viewable, 0.25mm dot pitch
- Max Resolution 1600x1200 @ 75Hz
- Weights 23kg with OSD

$775 MOMIT013

Mitsubishi Diamond View 1995 19"



- 19" Monitor for professionals
- 18" Viewable, 0.26mm dot pitch
- Max Resolution 1600 x 1200 @75Hz
- Weights 24kg with OSD
- BNC & 15Pin Input

$1149 MOMIT005

Editor's Choice apcmag

'the only 19" to equal & better Sony in our tests'
APC MAGAZINE APRIL 1999

Mitsubishi Diamond View 2107 21"



- 21" Monitor for professionals
- 20" Viewable, 0.26mm dot pitch
- Max Resolution 1600 x 1200 @85Hz
- Weights 30kg with OSD
- BNC & 15Pin Input

VALUE

$1925 MOMIT006

Editor's Choice apcmag

'Compared to the Sony Trinitron, the Diamond View scored equal to, or better than in every regard, apart from brightness'
APC MAGAZINE APRIL 1999

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MITSUBISHI CD-ROM DRIVES



DIAMOND DATA CD-ROM drives are Multi Read Compliant, support Ultra DMA data transfers and employ advanced Constant Angular/Linear Velocity for improved reads and transfers.

Code	Model	Price
MMMIT004	40x EIDE CD-ROM	$79
MMMIT005	50X EIDE CD-ROM	$99

MITSUBISHI DRIVES



Mitsubishi offers the latest innovation in floppy disk drive technology, the LS-120, with 120 megabyte capacity. The LS-120 is also compatible with older 1.44 MB disc.

Code	Model	Price
BUMIT000	Mitsubishi LS -120	$149
BUMIT001	120MB capacity diskettes	$25

3.5" 1.44MB Floppy Drive $25
FDMIT000

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3 YEAR ON SITE WARRANTY*

Hitachi CM 610 17" Monitor



- 16" Viewable image
- 0.23mm Horizontal Mask Pitch
- Max Resolution 1280x 1024 @60Hz
- Dimension: 398Wx 418Hx 413Dmm
- Weighs 15.5Kg

$560 MOHIT008

Hitachi CM 650 17" Short-Length



- 16" Viewable image
- 0.21mm Horizontal Mask Pitch
- Max Resolution 1280x 1024 @60Hz
- Dimension: 412Wx 431Hx 373Dmm
- Weighs 17Kg

$695 MOHIT001

Hitachi CM 766 19" Monitor



- 18" Viewable image
- 0.21mm Horizontal Mask Pitch
- Max Resolution 1600x 1200 @75Hz
- Dimension: 448Wx 442Hx 447Dmm
- Weighs 22Kg

Editor's Choice apcmag January 2000

$1065 MOHIT002

Hitachi CM 769 19" Professional



- 18" Viewable image
- 0.21mm Horizontal Mask Pitch
- Max Resolution 1800x 1350 @75Hz
- Dimension: 448W x 442Hx 447Dmm
- Weighs 22.5Kg

$1370 MOHIT003

Hitachi CM 811 21" Monitor



- 20" Viewable image
- 0.22mm Horizontal Mask Pitch
- Max Resolution 1600x 1200 @75Hz
- Dimension: 488Wx 482Hx 470Dmm
- Weighs 27.5Kg

$1995 MOHIT004

Hitachi CM 813 21" Performance



- 20" Viewable image
- 0.22mm Horizontal Mask Pitch
- Max Resolution 1856x 1392 @75Hz
- Dimension: 488W x 482Hx 470Dmm
- Weighs 27.5Kg

$2195 MOHIT005

Hitachi PCX-DT3 141 14.1" LCD



- Pixel Pitch 0.279mm
- Max Resolution 1024x 768 @75Hz
- Dimension: 375Wx 327Hx 199Dmm
- Weighs 6Kg
- Power Consumption Approx 35W
- Advanced Super TFT LCD
- Panel offers wider viewing angle up to 80° and brighter, Sharper images than CRT's

$2295 MOHIT006

Hitachi CML 150x E 15" LCD



- Pixel Pitch 0.279mm
- Max Resolution 1024x 768
- Dimension: 407Wx 372H x 215Dmm
- Weighs 8Kg
- Power Consumption 45W Max

$2485 MOHIT007

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Adelong Computers

Monitors

LG

FLATRON 17" 750FT plus



USB

Triple Free
- Eye Strain Free
- Distortion Free
- Tension Wire Free

Type:	17" (16.01" viewable)
Dot Pitch:	0.24mm Stripe Pitch
Max Resolution:	1600 x 1200/ 75Hz
V-Frequency:	50-160Hz
Communication:	DDC1 /2 with OSD
Certifications:	MPR-II, TCO-99, EPA, CE

Built in 4 port USB Hub

Unlike conventional flat CRTs, LG Flatron is completely 100% Flat, showing you images with enhanced color purity. Superior high resolution and innovative W-ARAS coating means less eye-fatigue due to reduced emissions and reflections.

$885 MOLGS000

Studioworks 500LC 15.1" LCD

Think Flat



Flat does working good. Slim does looking cool.



Type	15.1" TFT
Pixel Pitch	0.3mm
Max Resolution	1024 x 768/ 75Hz
V-Frequency	50-160Hz
Communication	DDC2 with OSD
Certifications	MPR-II, TCO-99, EPA, CE

If you think you can never be too rich or too thin, then the 500LC from LG is for you. With its rich, brilliant display and slim, elegant contours this TFT-LCD has a wide viewing angle, and multi-synchronous support up to 1024 X 768 @ 75Hz. What's more, all supported resolutions are shown at full screen size, automatically. The 500LC from LG. Enjoy the view.

$2225 MOLGS001

Scanners / Digital Cameras

AGFA

The best in imaging products at amazing prices. If you need excellent value or uncompromised image quality, Agfa Scanners and Digital Cameras are the way to go.

Scanners

SnapScan 1212p / 1212u

The 1212 series scanners offer 600 x 1200 dpi 36-Bit scanning and exceptional value for money. The 1212P is designed for connection to any PC. It's extremely easy to install, and is probably the fastest, most reliable parallel port scanner on the market. The Snapscan 1212u is a high quality A4 format scanner that is designed specifically for PC's and Macintoshes equipped with a Universal Serial Bus (USB).



1212p	1212u
$228	$249
IOAGF000	IOAGF001

SnapScan 1236s /1236u

Top model in the Agfa SnapScan range the Snapscan 1236 brings high performance scanning to both home and office environments. It scans formats up to A4, at 600 x 1200 dpi optical resolution, and registers more than 68 billion colours. An adapted SCSI card is included with the scanner. (1236s only).



1236s SCSI	NEW USB 1236u
$369	$350
IOAGF002	IOAGF006

Digital Cameras

ePhoto CL30

The compact design and simply operation of the ePhoto CL30 are ideal for both business and leisure applications. Images of 1440 x 1080 pixels, enhanced by unique PhotoGenie technology, make perfect photo quality prints.



USB UNIVERSAL SERIAL BUS

$815 IOAGF003

ePhoto CL50

The top quality ePhoto CL50 compat digital camera doesn't only produce graet photo's, it registers panoramas, animated clips and even your voice! Four capture modes plus burst mode. In 1600 x 1200 mode, there's ample detail for photo quality prints (8" x 10")



$1625 IOAGF004

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A4 Colour Inkjet

Value

Stylus Colour 460

- A Windows only printer, the EPSON STYLUS COLOR 460 is ideal for first time users, students and families experimenting with colour.
- 4ppm Black/2.5ppm Colour
- 720 x 720 DPI

$235

PREPS028



Home User

Stylus Colour 660

- Perfect Photo Quality printer for desktop publishing at home. It features true 1440 x 720 dpi resolution.
- 5ppm Black/3.5ppm Colour
- 1440 X 720DPI

$305

PREPS029



SOHO

Stylus Colour 760

- Delivers a precisely controlled ink droplets - the result is greater detail and smoother halftones. It's PC and Mac. compatible and offers USB connectivity.
- 7ppm Black/6.8ppm Colour
- 1440 X 720DPI

$510

PREPS030



Specialist Printers

Professional

Stylus Colour 860

- The EPSON STYLUS COLOR 860 is a revolutionary new printer targeted at business and professional graphics users wanting maximum colour output combined with speed and affordability.
- 9.5ppm Black/9.3ppm Colour
- 1440 x 720 DPI

$595

PREPS031



Office Colour

Stylus Colour 900

- It also offers flexible connectivity, Serial, USB, Parralel and optional ethernet.The combination of printing technologies ensure it is a high-speed, high-image quality printer.
- 12ppm Black/11.7ppm Colour
- 1440 X 720DPI

$779

PREPS024



Over Size Colour

Stylus Colour 1160

- The new EPSON STYLUS COLOR 1160 is a revolutionary printer targeted at business and professional graphics users wanting maximum colour output combined with speed and affordability and the versatility of printing larger than A3. USB and Parrallel interfaces.
- 9.5ppm Black/9.2ppm Colour
- 1440 x 720 DPI

$870

PREPS032



Refer to our website for a great range of Printer Cartridges

Photo Printers

Photo Colour

Stylus Photo 700

- Industry-leading 1440 dpi resolution this printer offers the highest image quality of any home-use inkjet printer available today. What's more, it's ability to deliver both photographic colour and black text printing makes it ideal for All your home printing needs.
- A4, A5, Envelope, Index Cards, Photo paper
- 1440 x 720 DPI

$419

PREPS011



Graphic Reproductions

Stylus Photo 1200

- Introducing the A3+, six-colour photo- reproduction quality inkjet printer for graphic artists and professional photographers. The EPSON STYLUS PHOTO 1200 delivers 1440dpi, full-bleed A3 prints with ink droplets invisible to the naked eye
- A3+, A4, A5, Envelope, Index Cards, Photo paper
- 1440 x 720 DPI

$965

PREPS025



Scanners

HEWLETT PACKARD

ScanJet 3200C

This affordable scanner features HP's exclusive Intelligent Scanning Technology to optimize photos, drawings and text automatically. And, you can pair it with your color printer to make color copies. Here's a versatile scanner for the entire family!

- 30bit internal
- 600 x 1200 DPI
- 9600 DPI enhanced
- Parrallel port connection
- HP PrecisionScan LT with automated OCR



$179 IOHPD020

ScanJet 3300C

For easy scanning and copying, try the HP Scanjet 3300C. Setup is a breeze with the USB interface and Windows 98. Just plug it in. You can scan or copy at the touch of a button.

- 36bit internal
- 600 x 1200 DPI
- 9600 DPI enhanced
- Windows 98 USB
- HP PrecisionScan LT with automated OCR
- Push button Scan and Copy



$239 IOHPD027

ScanJet 5200C

The HP ScanJet 5200C Business Series color scanner delivers quality results up to three times faster than other scanners. One button starts any project! The HP ScanJet 5200C offers hassle-free connectivity through the parallel port, or Universal Serial Bus (USB).

- 36bit internal
- 600 x 1200 DPI
- 9600 DPI enhanced
- USB and Parrallel port connection
- HP PrecisionScan 2.0 with automated OCR



$379 IOHPD023

Printers

HEWLETT PACKARD

Adelong Computers

Hot New Products

Photoreproduction

PhotoSmart P1000 / P1100

- HP's Photosmart range can be connected to a PC as a photoquality printer or print directly from HP memory cards. No PC no hassles. You just won't believe the quality of PhotoRet 3 printing, you must see it to believe it.
- 11ppm Black / 8.5ppm Colour (P1000)
- 12ppm Black / 10ppm Colour (P1100)
- 2400 x 1200 DPI PhotoREt 3

P1000 **$775** PRHPD066

P1100 **$965** PRHPD067



All in One

Office Jet T Series

- The latest Deskjet technology is used in the new HP T series OfficeJet. You get stand alone fax capabilities as wells as scan, copy and print functions. All of this using HP's PhotoRet II, which means that image quality is excellent and print speed is faster than ever. All T series come with OCR and imaging software.

T65

- 11ppm Black / 8.5ppm Colour
- 600 x 600DPI PhotoREt II
- 10 Speed dials

$965 PRHPD065

T45

- 9ppm Black / 6.5ppm Colour
- 600 x 600DPI PhotoREt II

$875 PRHPD064



DeskJet

Economy

Deskjet 610C

- Inexpensive and easy to use, the HP DeskJet 610C printer produces affordable, high-quality colour and black printing for all your home and school needs.
- 5ppm Black / 2.5ppm Colour
- 600 x 600 DPI
- Optional Photo printing

$239 PRHPD061



Value

DeskJet 810C

- Produce projects with photo-quality images and crisp black text for school and home easily, quickly and creatively with the new HP DeskJet 810C printer.
- 6.5ppm Black / 4.5ppm Colour
- 600 x 600 DPI Photo REt II

$339 PRHPD056



Home

Deskjet 830C

- For people who want a versatile printer to work faster and smarter. Featuring PhotoREt II and HP's Colour Layering Technology. This printer is the perfect all round machine, it has both parallel and USB connections.
- 8ppm Black / 5ppm Colour
- 600 x 600 DPI PhotoREt II

$389 PRHPD062



Refer to our website for a great range of Printer Cartridges

OfficeJet

Professional

DeskJet 880C

- Your creative printing projects will look their best with the HP DeskJet 880C printer. Whether it's spectacular colour photos or elegant type you want, the DeskJet 880C can bring your imagination to life.
- 8ppm Black / 5ppm Colour
- 600 x 600 DPI Photo REt II

$475 PRHPD051



Office Colour

DeskJet 895Cxi

- The HP DeskJet 895Cxi delivers outstanding results that give you a competitive edge. Photo-quality colour enriches your documents with persuasive power. And crisp, rich blacks produce laser-quality text and graphics to impress the most discerning audience.
- 10ppm Black / 6ppm Colour
- 600 x 600 DPI Photo REt II

$639 PRHPD043



Professional Office Printer

Deskjet 970Cxi

- The premier photo-quality printer for busy professionals who take their image very seriously. Featuring stunning photo-quality with PhotoREt 3, and laser like text at up to 12ppm. Innovations like automatic two sided printing, USB connection and extra large 150 sheet paper tray are exclusive to the 970Cxi.
- 12ppm Black / 10ppm Colour
- 2400 x 1200 DPI PhotoREt 3

$785 PRHPD063



LaserJet

Over-Size PhotoColour

DeskJet 1120C

- Get the big picture with the HP DeskJet 1120C Professional Series printer. Photo-quality color and versatile printing at sizes up to 11 x 17 inches make it ideal for businesses that want printing options, not printer limits.
- 6.5ppm Black / 4.5ppm Colour
- 600 x 600 DPI Photo REt II

$785 PRHPD025



Laser Quality

LaserJet 1100

- You need the convenience and privacy of a personal printer.. With the HP LaserJet 1100 printer, you can put fast, personal laser printing for business right on your desk.
- 8ppm Black Laser
- 600 x 600 DPI
- 120 sheet paper tray
- Optional Scanner attachment

$785 PRHPD041



Personal Laser

LaserJet 2100

- The HP LaserJet 2100 family offers versatile printing solutions for individuals and small workgroups. The LaserJet 2100 comes with outstanding features and offers a high degree of flexibility for your business requirements.
- 10ppm Black Laser
- 1200 x 1200 DPI
- 300 sheet paper tray

$1345 PRHPD047



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Fax: (02) 9697 9777

CITY OFFICE
127 York Street
Sydney NSW 2000
Ph: (02) 9267 5272
Fax: (02) 9267 5042

BubbleJet

Value

BJC-265SP

- Unbelievable value with this versatile bubblejet printer. For even greater versatility, the BJC-265SP offers the option of PhotoRealism inks. The PhotoRealism inks for photorealistic prints at a low price.
- 3.4ppm Black / 0.5ppm Colour
- 720 x 360 DPI

$135

PRCAN026



Home User

BJC-2000SP

- The user-friendly BJC-2000SP features dual ink tank for true blacks. Meet the one-stop solution for all your home-office printing needs. The optional colour scan head can be used for colour scans, OCR and faxing. Windows®95 or 98 only.
- 5ppm Black / 2ppm Colour
- 720 x 360 DPI Resolution

$175

PRCAN029



SOHO

BJC-5100

- Snap in a second black cartridge for double the print speed or snap in the colour cartridge for photo realistic colour printing. They don't come any more versatile. Print up to A3.
- 10ppm Black / 4ppm Colour
- 1440 x 720 DPI

$350

PRHPD031

NEW



Over-Size Photo Colour

BJC-5500

- For all oversize printing needs, this is the printer for you. It handles cut sheets up to A2 and also feature an in biult tractor feeder. All this in either high speed black or full photo colour.
- 7ppm Black / 2.5ppm Colour
- 1440 x 720 DPI

$1320

PRCAN013



SOHO

BJC-6000

- Presenting the ultimate in Speed, Quality, and Cost-Effectiveness. The new standard in colour printing from Canon. Using 6 colour printing and drop modulation technology, the BJC-6000 produces photorealistic images.
- Separate ink tanks for each colour
- 8ppm Black / 5ppm Colour
- 1440 x 720 DPI

$475

PRCAN028



Professional

BJC-7100

- Need to print high quality colour images at high speed, then the 7 colour photo realism system in the Canon BJC-7100 will be the perfect choice. Capable of photorealistic printing on plain paper, this high speed bubblejet is perfect for the demanding graphics user.
- 8ppm / 5ppm Colour
- 1200 x 600 DPI

$515

PRHPD025



Refer to our website for a great range of Printer Cartridges

Portable

Compact

BJC-50

- The "super portable" portable with breakthrough colour, super fast blacks, cable-less communications, optional colour scanner, only half the size of an A4 page!
- 5.5ppm Black / 2.1ppm Colour
- 720 x 360 DPI

$615

PRCAN020



Instant Scan Capabilities

IS-12 Scanner head

$135

PRCAN001

Compact

BJC-80

- Portable printing solution with all the features of a desktop printer. Drop modulation technolgy and features that are exclusive to the portable environment like IRDA. Best of all it is only 1.4Kg and fits in half a briefcase.
- AC/ Battery Powered
- 4.5ppm / 1ppm Colour
- 720 x 360 DPI

$345

PRCAN000



Instant Scan Capabilities

IS-12 Scanner head

$135 PRCAN001

Desk Laser

LBP-800

- Compact desktop 8ppm laser printer with face up or down paper delivery, 125 page Multipurpose Tray and single sheet Manual Feed Slot. Comprehensive job control via Canon Advanced Printing Technology driver software including Match Paper Size, Multipage per Sheet , collate, Form Overlay, Customer Paper Size, Toner Saver and Automatic Image Refinement modes.
- 8ppm
- 600 x 600 DPI

NEW

$575

PRCAN030



PRCAN018 LaserBeam LBP1760 **$1735**

Scanner

Value

FB-330P

- Parallel
- A4 36-bit Scanner
- 300 x 600 DPI Optical Resolution
- Includes Canon Software Bundle

$135

IOCAN010

Parallel Inerface

SOHO

FB-630P

- Parallel
- A4 36-bit Colour Scanner
- 600 x 1200 DPI Optical Resolution
- Includes Canon Software Bundle

$175

IOCAN011

600 x 1200 DPI

USB

FB-630U

NEW

- USB A4 36-bit Colour Scanner
- 600 x 1200 DPI Optical Resolution
- Windows 98, iMac & Mac G3 Compatible
- Includes Canon Software Bundle & Canon Mac Plug-in (Canon Scan Toolbox in Place of Scangear Mac Adobe Photo Deluxe 20.)

$229

IOCAN012



HEWLETT PACKARD

Adelong Computers

OfficeJet

Economy

OfficeJet 635

- The HP OfficeJet 635 is a colour printer, colour copier, colour scanner and plain paper fax. This is the best value All-in-One product that makes it easy to complete your work.
- 5ppm Black/ 2ppm Colour
- 600 x 600 DPI Photo REt
- 150 sheet paper tray



$585 PRHPD033

Colour Faxing

OfficeJet 725

- The HP OfficeJet Series 700 prints, faxes, scans and copies all in color. That's right-it even sends and receives color faxes with other color fax machines. You can even scan and send color documents to anyone with an email address.
- 5ppm Black/ 2ppm Colour
- 600 x 600 DPI Photo REt
- 150 sheet paper tray



$679 PRHPD055

Office Laser

LaserJet 3100

- The HP LaserJet 3100 is a versatile business tool that delivers convenient printing, faxing, copying and scanning capabilities in a single laser device, and enables you to communicate more effectively with customers and clients.
- 6ppm Black Laser
- 600 x 600 DPI
- 100 sheet paper tray



$1389 PRHPD034

OfficeJet

Flatbed

HP Office R45

- The reliable HP OfficeJet R45 fits right into the busiest home office or small business. It provides printing, scanning, and copying, all in colour, and all in one easy-to-use product. That saves space, reduces clutter, and simplifies set-up.
- 11ppm Black/ 8.5ppm Colour
- 600 x 600 DPI Printing
- 600 x 2400 DPI 30 bit Flatbed Scanning
- 100 sheet paper tray



$989 PRHPD058

Office Automation

HP Office R65

- The reliable HP OfficeJet R65 Series gives you high quality performance and versatility for professional results. The razor-sharp text and fast, photo-quality color printing makes documents stand out, whether they're financial spread sheets or color brochures.
- 11ppm Black/ 8.5ppm Colour
- 600 x 600 DPI Printing
- 600 x 2400 DPI 30 bit Flatbed Scanning
- 100 sheet paper tray
- 30 page automatic document feeder



$1145 PRHPD059

Refer to our website for a great range of Printer Cartridges

Printers

SAMSUNG

SAMSUNG LASER PRINTERS Challenge the Limits of business Performance!

Office Laser Printer

ML-5000A

Fast 8PPM Printing Speed
True 600 x 600 DPI Outstanding Resolution
HP®PCL®5e Compatible Emulation
Various 45 scalable Fonts
One-piece Integrated Toner & OPC imager of 5000 Pages at 5% Coverage
Easy to Use-Easy installation

$599 PRSAM000

Printer Toner Cartridge for ML-5000A
$199 INSAM003
5000 pages per cartridge



Business Laser Printer

ML-6050

Fast 12PPM Printing Speed
True 600 x 600 DPI Outstanding Resolution
HP®PCL6® Compatible Emulation
Various 45 scalable Fonts
One-piece Integrated Toner & OPC imager of 5000 Pages at 5% Coverage
Easy to Use-Easy installation

$899 PRSAM001

Printer Toner Cartridge for ML-6050
$199 INSAM004
5000 pages per cartridge



SECOND TRAY FEEDER IS AN OPTIONAL EXTRA

Workgroup Laser Printer

ML-7000

Fast 17PPM Printing Speed
Superior Printer Performance
100Mhz RISC Processor
First Page Printing Time of Under 13 Seconds
HP®PCL6® Compatible Emulation
Optional Postscript Level II
Optional Ethernet Card for Robust Network Connectivities
Standard Duplex Printing Function

$1599 PRSAM002

Printer Toner Cartridge for ML-7000
$299 INSAM005



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Microsoft IntelliMouse Explorer

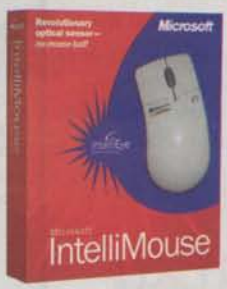


Point and click with pinpoint accuracy-literally! The new IntelliMouse Explorer from Microsoft is so advanced, it doesn't need a mechanical ball as its been replaced with the new IntelliEye optical sensor, which provides consistent accuracy and control on virtually any surface.

- Features 2 additional, customizable buttons
- Includes the IntelliMouse scrolling wheel

$95 IOMST012

Microsoft IntelliMouse IntelliEye



The IntelliMouse with IntelliEye gives you superior precision with its revolutionary optical sensor that scans your desktop 1,500 times a second. It works on virtually any surface-so no mouse pad or roller-ball cleaning is required. The IntelliMouse with IntelliEye also features an ergonomic design and a wheel for efficient zooming and scrolling.

$75 IOMST013

Microsoft Natural Keyboard Pro



The new ergonomic Microsoft® Natural® Keyboard Pro features 19 "Hot Keys," which link directly to applications on your PC and the web. Plug in up to 2 USB devices directly into your keyboard.

$109 IOMST014

Microsoft Internet Keyboard



Includes 10 hot keys on a comfortable design that also features a detachable palmrest for added comfort. Hot Keys allow instant access to email and internet functions.

$55 IOMST015

Microsoft SideWinder Dual Strike



Dual Strike integrates the directional control of a keyboard, the precision of a mouse, the fun and excitement of a joystick, and the comfort of a game pad-all in one single and versatile handheld unit. Dual Strike device controls functions like running, dodging, side-stepping as well as aiming, navigation, and coordinating difficult moves like strafing and circle strafing. USB Port required

$89 IOMST016

Microsoft Precision Racing Wheel



The Precision Racing Wheel includes a compact, yet rugged, state-of-the-art PC steering wheel, an easy-to-release clamp, and sturdy, non-slip pedals. The Precision Racing Wheel also features 8 buttons, including 2 shifters/triggers, which you can program and customize for your own driving preference

$149 IOMST017

Camera/Speakers

Logitech

QuickCam™ Express

Make face to face online meetings a reality over the Internet. Snap and send photos and video-emails with the ease.

- 24 bit colour
- 352 x 288 resolution at 16fps



$95 IOLOG022

SoundMan® X1

From soaring high notes to deep bass, you'll experience the full, complex richness of your favorite music and crisp, clear sound whether you're down-loading from the Internet, getting into MP3 audio, or listening to your favorite CD.



- 25 Watts RMS
- Frequency Power 38Hz - 20Khz

$125 MMLOG001

SoundMan® G1

These speakers handle sound across the full sound spectrum to add high-quality, realistic audio to your multi-media computer, portable CD player, or TV. Just plug the speakers in and start listening. Full volume and bass controls and headphone jack.



- 8 Watts RMS
- Frequency Power 55Hz - 18Khz

$69 MMLOG000

SoundMan® X2

Experience theater-quality audio that captures crisp, clear highs & deep, rich bass. Enjoy the full, high-definition sound spectrum and add ultra-realistic, high fidelity sound to any multimedia computer



- 40 Watts RMS
- Frequency Power 30Hz - 20Khz

$175 MMLOG002

Adelong Computers

Adelong Computers

DES-1005D 5 Port Switch

The DES-1005D is an unmanaged 10/100Mbps switch designed to enhance small workgroup performance while providing a high level of flexibility. Powerful yet easy to use, this device allows users to simply plug any port to either a 10Mbps or 100Mbps network to multiply bandwidths, boost response time and satisfy heavy load demands.

Features,

- 5x 10/100Mbps ports
- MDI uplink port for easy expansion
- All ports support full/half-duplex
- Flow control for protection against data loss
- Dynamic buffer allocation for each port
- Auto-learning of network configuration
- Secure store-and-forward switching scheme
- Auto-correction of reverse twisted-pair polarity
- Compact palm-sized

NEW



$175 NWDL048

Switches

Code	Model	Ports	10Mbps	100Mbps	Price
NWDLI022	DES-1008	8	✔	✔	$610
NWDLI032	DES-1016	16	✔	✔	$1215
NWDLI035	DES-1024	24	✔	✔	$1745
NWDLI050	DES-3224	24	✔	✔	$2995

NEW

DMF-560TXD 10/100Mbps PCMCIA Card

The D-Link DMF-560TXD is a Direct Port 10/100Mb Dual Speed Ethernet PC Card with an integrated V.90/K56flex Data/Fax Modem. It allows PC or Power MAC laptop users to seamlessly connect to both Ethernet and Fast Ethernet LANs. The D-Link DMF-560TXD also allows users to send and receive faxes, connect to the Internet, and dial into a Remote Access Server or PC using this one PCMCIA PC Card.



DONGLE FREE

$395 NWDL104

PCMCIA Fax/Ethernet Cards and Fax/Modems

Code	Model	Description	Price
NWDLI003	DE-660CT	10Mbps PCMCIA Ethernet Card	$105
NWDLI043	DFE-660TX	10/100Mbps	$145
FMDLI001	DFM-560E	56K V.90 & Flex External Fax/Modem	$129
FMDLI000	DFM-560I	56K V.90 & Internal Fax/Modem	$85

Ethernet and Fast Ethernet Adaptors

Code	Model	Bus	Speed	Price
NWDLI000	DE-220PCT	ISA	10Mbps	$35
NWDLI001	DE-528CT	PCI	10Mbps	$39
NWDLI002	DFE-530TX	PCI	10/100Mbps	$55

DP-692 9 Port Hub + Internet Server

The DP-692 streamlines your network by combining a 9 port Hub and Internet Server. It allows user on the network to connect to the Internet using only one ISP account.

Features,

- 2 Port Internet Server with a built in 9 port Hub + Uplink.
- Dial on demand, web browser and telnet.
- 9x10Mbs RH 45 Ethernet Port,1XCombo BNC &RJ45.
- 2x Serial Ports



$525 NWDLI047

Internet Servers

Code	Model	Ports	Network Port	Price
NWDLI024	DP-602	2x Serial Port	10/100Mbps	$485
NWDLI046	DP-601M	1x 56K V.90 Modem Port	10/100Mbps	$525
NWDLI034	DP-802	1x Parallel + 56K Modem	1x10/100Mbps	$580

NEW

Print Server

Code	Model	Ports	Network Port	Price
NWDLI015	DP-300	2x Parallel, 1 x Serial	10/100Mbps	$435



DU-H4 4 Port USB Hub

These USB Hubs allow you to connect up to 4 USB peripherals for use with a single PC.

$75 NWDLI037

DU-H3SP 3 Port USB with 1 x Serial, 1 x Parallel

Multipurpose device allows connection of up to 3 USB peripherals, 1 serial device and 1 parallel port device such as a printers and modems.



$169 NWDLI038



DU-E10 x Port USB 1 USB Port, 1 10Base-T port

This adapter is the fastest and easiest way to connect desktops, laptops and notebooks to 10Mbps Ethernet network. All users have to do is plug in the adapter to the PC's USB port to connect to the network.

$87 NWDLI049

Hubs

Code	Model	Ports (RJ45)	Speed	Price
NWDLI017	DE-805TP	5	10Mbps	$89
NWDLI004	DE-809TC	8	10Mbps	$105
NWDLI042	DE-816TP	16	10Mbps	$279

Dual Speed Hubs

Code	Model	Ports (RJ45)	Speed	Price
NWDLI045	DFE-905DX	5	10/100Mbps	$240
NWDLI012	DFE-908DX	8	10/100Mbps	$355
NWDLI014	DFE-916DX	16	10/100Mbps	$695
NWDLI020	DFE-2624X	24	10/100Mbps	$1325

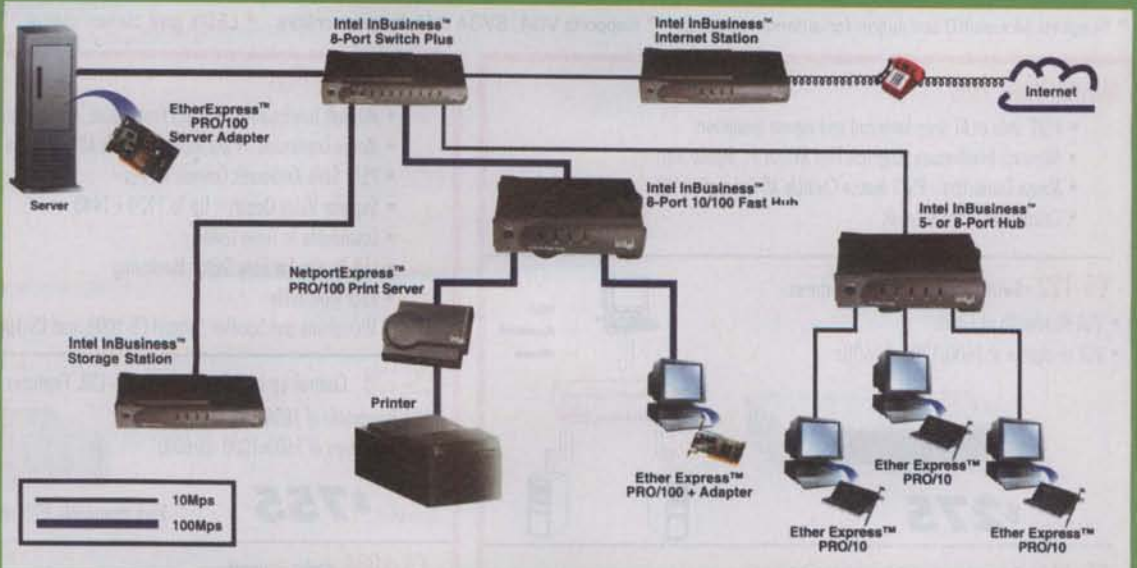
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Fax: (02) 9267 5042

intel InBusiness™ Small Business Networking Products



Ethernet PCI Adapters

For customers who want basic, high speed connectivity, the Intel® PRO/100+ provides peak performance and Adaptive Technology to optimise network performance. 10/100M auto-negotiation automatically connects at the highest speed for maximum performance.



Server Adaptor
$195
NWINT016

Management Adapor
$149
NWINT015

InBusiness™ Switch

The Intel® InBusiness™ 10/100 Switch is perfect for improving the performance of your network using standard or Fast Ethernet. Designed to give users high-speed performance at an affordable price.

- Plug & Play installation
- Auto sensing ports automatically detect speed of connected device. Switching provides each user or hub a direct channel to network devices



4 Port
$295
NWINT019

8 Port
$485
NWINT014

InBusiness™ Hubs

Intel® InBusiness™ Hubs are designed so you can easily create your own small network or expand an existing network in minutes. Designed to be small enough for the desktop, they are the perfect solution for sharing devices and other resources.

- Simply Plug & Play Installation
- Crossover port allows you to connect to other Hubs
- Choice to 10 or 100Mbps RJ-45 Ethernet Connectivity



Code	Model	Speed	Price
NWINT008	5-port	10Mbps	$95
NWINT009	8-port	10Mbps	$119
NWINT010	4-port	100Mbps	$195
NWINT011	8-port	100Mbps	$359
NWINT012	8-port	10/100 Auto	$395

InBusiness™ Print Station

The Intel® InBusiness™ Print Station is the easy way to share printers over a network. Set-up is so simple that within minutes your small business can be printing to shared printers over a 10 or 100Mbps network. Now you can locate up to 2 printers anywhere on your network independent of PCs with a single Print Station.

- 10 or 100Mbps Ethernet Connection
- Supports 2 Parallel Printers
- No configuration hassles with simple installation wizard



$315
NWINT007

InBusiness™ Internet Station 56K

The Intel® InBusiness™ Internet Station 56K is the ideal way to connect your small office to the Internet. Cost-effectively share one analog phone line, and one Internet account over the network. Easily combine multiple analog connections and line to increase your Internet access speed up to two times current analog speed. The Intel InBusiness Station 56K is part of a complete line of networking products designed specifically for small business.

- 2 x RJ-11 Phone Ports, 9-Pin Serial Port
- 4 x 10Base-T Ethernet Ports
- Supports TCP/IP, DNS, DHCP, CHAP, HTTP
- Built in 56K Modem
- Includes brower based setup software



$545
NWINT018

InBusiness™ Storage Station

The InBusiness™ Storage Station lets your office share files over the network, and includes PC backup software for data protection. Simple installation and setup make it the easiest way to provide shared storage for your employees by simply draging and dropping files on a central drive.

- 10 or 100Mbps Ethernet Connectors
- Supports TCP, DHCP, FTP, HTTP, SMB
- Includes Client installer CD software



12GB
$1815
NWINT004

24GB
$2645
NWINT005

Adelong Computers

Data Switches / Video Switches

Never again will you need multiply monitors, keyboards and pointing devices with the range of CPU Switching devices. A single keyboard, mouse and monitor can control up to 8 computers simultaneously without any cable changes. These CPU Switches are digital and require only the push of a button. Excellent for network administrators or anyone who wishes to control 2 or more computers hassle free!

Features:

- Supports Mouse/KB emulation for automatic bootup
- Supports VGA, SVGA & Multisync monitors
- LED's give current status
- Easy to install & use

Adelong Computers

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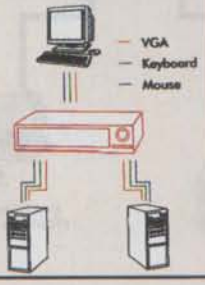
Master View Plus

- PS/2 style or AT style keyboard and mouse connectors.
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- CS-122 Switch between 2 PCs. Features:

- VGA Bandwidth of 180Hz
- VGA resolution of 1600x1200 @60Hz



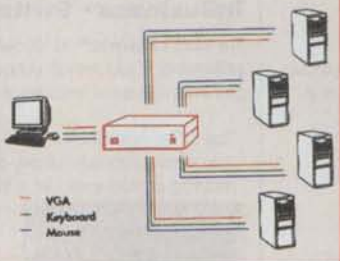


DSADE037 **$275**

- CS-114 Control up to 4 PCs with the CS-114.

- VGA Bandwidth of 100Mhz
- VGA Resolution of 1024x768 @80Hz
- Support intellimouse wheel





DSADE038 **$375**

- CS-128

- 8 Port Switch Box

AT & PS/2



DSADE036 **$695**

Item Code	Description	Price
CBGEN127	AT CABLE SET for CS-128	$39
CBGEN128	PS/2 CABLE SET FOR CS-128	$39

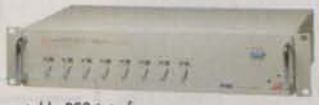
Master View Plus

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- Mouse Conversion - PS/2 Mouse Controls All Connected PCs
- PS/2 Style Keyboards Controls All PCs
- Superior Video Quality - Up To 1920 x 1440
- Cascadable To Three Levels
- LED Display For Easy Status Monitoring
- Rack Mountable
- Microphone and Speaker Support CS-1008, and CS-1016

EXCELLENT FOR MULTIMEDIA

- CS-138 Control up to 8 PCs with the CS-138. Features:

- VGA Bandwidth of 180Mhz
- VGA Resolution of 1600x1200 @60Hz

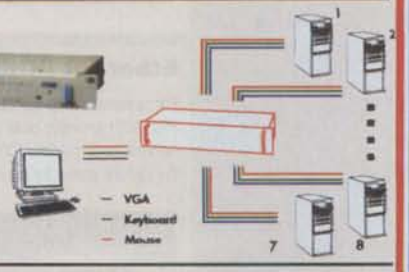


DSADE041 **$755** Rack mountable PS2 interface

- CS-1008 Audio Support

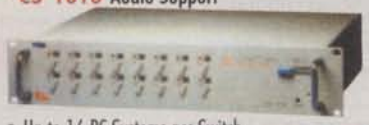


- Up to 8 PC Systems per Switch
- Connect up to 256 PC Systems
- 180Mhz VGA Bandwidth

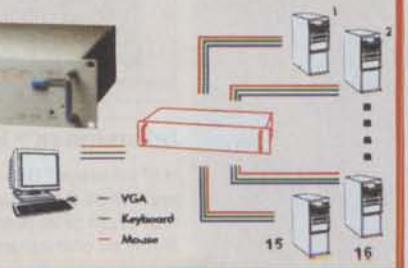


DSADE045 **$795**

- CS-1016 Audio Support



- Up to 16 PC Systems per Switch
- Connect up to 512 PC Systems
- 180Mhz VGA Bandwidth



DSADE046 **$1350**

CPU SWITCH CABLE SET

each cable set connects to one computer.

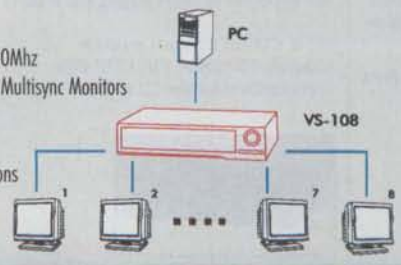
Code	Model	Price
CBGEN098	3M AT Cable Set CS/122/114	$35
CBGEN099	3M PS/2 Cable Set CS/122/114/138	$35
CBGEN127	3M PS2 Cable Set CS128	$35
CBGEN128	3M AT Cable Set CS128	$35
CBGEN163	1.8M AT Cable Set CS122/114	$29
CBGEN164	1.8M PS/2 Cable Set CS122/114/138	$29
CBGEN166	10M PS/2 Console Extenstion M/F	$65
CBGEN168	3M PS/2 Cable Set CS 1008/1016 Audio	$39
CBGEN169	3M AT Cable Set CS1008/1016 Audio	$39
CBGEN170	5M PS/2 Cable Set CS1008/1016 Audio	$50
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- Supports VGA, SVGA, XGA, Multisync Monitors
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USB HUB with Printer Port and Serial Port

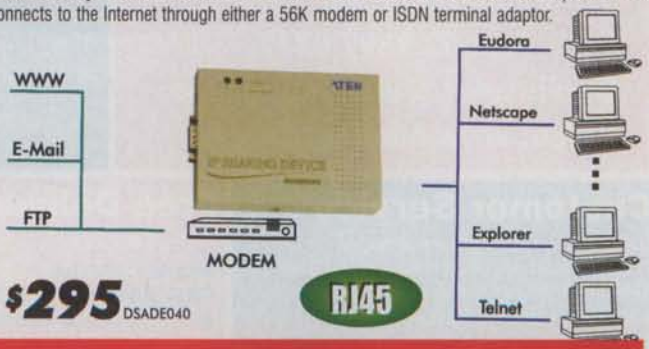


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- Over current detection protection & recovery.
- Plug & Play capability for outside peripherals.
- Support UHCI & OHCI spec.
- Windows FIFO UART

IP SHARING DEVICE

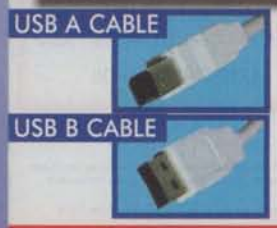
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$295 DSADE040

RJ45

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CBGEN181	3M USB A-B CABLE	$18
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CAADE016	SCSI III DB68 Case	$185

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H: 390mm

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Styles may vary

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H: 155mm



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After Hours

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Net savvy

The Internet for Dummies (Australian Edition)

There was a time when new Internet users learnt their skills from a free text document written by the Electronic Frontiers Foundation (EFF), called *The Big Dummy's Guide to the Internet*. The 'for Dummies' concept is now a registered trademark of IDG Books and this Australian Edition of the company's well-known Internet guide is quite a good introduction to the online world of 2000.

Finally, a great deal of work has been put into adapting a US-centric edition into something Australians can really use. It appears journalist and entrepreneur Geoff Ebbs has been given free rein to Australianise anything he deems necessary — whole chapters have been rewritten to suit the local market, referring to local ISPs, local mirror sites and Australian-owned ecommerce ventures.

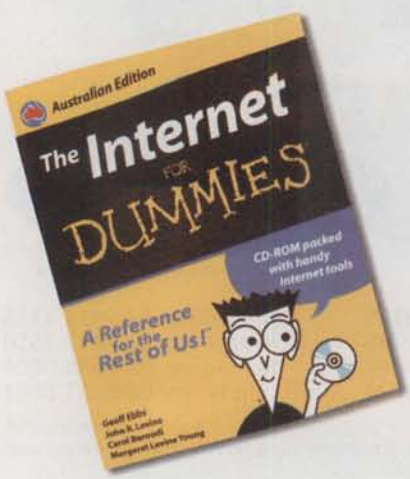
Where once examples might have mentioned 'Jell-O', they now refer to 'kangaroo tail soup'. Yahoo is referred to as Yahoo-a-roo and AltaVista becomes, ahem — AltaVista-a-rista. The title page of each section is even illustrated by top Australian cartoonist Alan Moir (apparently in return for a Moir Web site plug). Meanwhile, IDG Books Australia has contracted Ms Megabyte (of *Woman's Day*) to localise *PCs for Dummies* and Veechi Curtis to adapt *MYOB for Dummies*. It is to be hoped this trend spreads to other reference book importers.

The book ships with a CD full of TCP/IP and HTML software, along with OzEmail's standard 100 hours free access signup offer.

It won't take you very deep into the Net, but this book's information is accurate and thorough (although if the authors are still wondering about Thomas Boutell — well, he wrote and maintained the original World Wide Web FAQ in 1993 following Tim Berners-Lee's invention of the Web). No-one *needs* a guidebook to get started on the Net, but if you're looking for a beginner's manual, *The Internet for Dummies* is worthwhile.

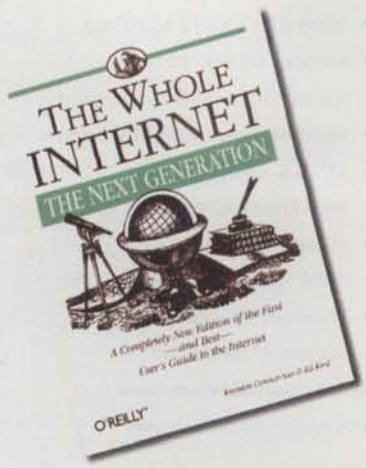
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Author	Geoff Ebbs, et al
Publisher	IDG Books Australia
Distributor	Woodslane
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Price	$29.95
ISBN	1-74031-000-4
Rating	★★★★



The Whole Internet: The Next Generation

If you're going to San Francisco, along with flowers in your hair, you will need to bring knowledge of the WELL. The Whole Earth 'Lectronic Link was an early 1990s cybercommunity which spawned Internet notables such as John Perry Barlow and Howard Rheingold, who in turn had connections with The Grateful Dead and an alternative culture journal, *The Whole Earth Catalog*. Though not directly related, the best (and first) Internet user's guide of the time was dubbed *The Whole Internet User's Guide and Catalog*. Author Ed Krol became another Net.legend.



Several editions later, the book has hundreds of competitors and a new co-author. Kiersten Conner-Sax adds quirk to the droll Krol manner, referring to the book as TWING and introducing editorials to several sections based on her personal online experiences. Conner-Sax appears to have married during the writing process, and the events in her life have humorously influenced various sections and screenshots (let's all learn how to make a Web page about getting engaged).

TWING serves as an introduction to the Internet, but intermediate users will also benefit from some of its more advanced sections — the chapter on esoteric and emerging technologies, for example. There is also an excellent chapter on what to do if the Internet fails you; other introductory

Guide to ratings

★	Like a mutilated rabbit from your lover
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books usually leave the reader hanging, but TWING's advice will help you find the reason you can't reach a Web site or get a new streaming client to work properly.

Some parts of the book are downright American and fairly useless for Australian readers. One of the more annoying chapters in this respect describes online games, referring constantly to US-based services (only some of which have representation in Australia) and ignoring the fact that many games do not even require these third parties.

There's still plenty on offer here for Southern Hemisphere readers. Good advice is offered on topics such as privacy concerns and even on connecting your entire home network to the Internet, while all technical information is explained accurately in plain English.

Simon Vandore

Author	Kiersten Conner-Sax, Ed Krol
Publisher	O'Reilly
Distributor	Woodslane
Phone	(02) 9970 5111
Price	$49.95
ISBN	1-56592-428-2
Rating	★★★★

C++ in Plain English

C++ in plain English: now that's a novel concept, and an attractive one at that. C++ programming is a tough subject that is riddled with jargon. Too many texts leave the average reader buried under a mound of terminology.

Consequently, this book was approached with a certain amount of anticipation. Sadly, the expectation was met with a little disappointment. The concept is good, the layout is good, but the content has some way to go.

The warning bells sounded in chapter two, as we encountered the first program example. This example started with the classic "void main()" error (it's "int main()", darn it, "int main()"!), but things didn't improve from there. Chapter two, and most of chapter three claim to introduce C++, but they really introduce C. The unsuspecting reader is taught printf and scanf for i/o, malloc and free for memory allocation and "pass by reference" functions using pointers instead of references. These are all good C technique, but are not recommended in C++, as better methods are available.



In chapter four you finally get to some real C++, but again it is disappointing. Although the cover of the book proudly bears the label "Covers the new ANSI/ISO standard spec", the C++ which is described is clearly obsolete, pre-ANSI C++.

There is a seven-page appendix towards the back that describes a few of the new ANSI features, but the main text of the book concentrates firmly on the obsolete version. The second half of the book, an alphabetical reference, is laid out in quite an innovative way. If the content were better, this could have been an excellent teaching tool. Unfortunately, problems with the book's content severely limit its usefulness.

Michael Smith

Author	Brian Overland
Publisher	M&T Books
Distributor	Woodslane
Phone	(02) 9970 5111
Price	$34.95
ISBN	0-7645-4572-8
Rating	★★

Great Web Architecture

There were, at last count, about 3 million books, CDs, training courses and singalong exercise machines that will help you learn how to code HTML. These vary from the very simple ('Use FrontPage, and don't forget the banner ads!') to the highly complex ('Writing your own search scripts could be fun!'), but many of them don't spend much time looking at how to design an entire Web presence.

Clay Andres' *Great Web Architecture* shows you how to design a Web site. More specifically he discusses how overall site design can affect perceptions of your page, and in the case of commercial enterprises, your end product.

As you'd expect in a book preoccupied with design issues, *Great Web Architecture*'s layout is excellent — very colourful and glossy, with ample screen grabs to complement the text. Real life examples are used abundantly — in fact, it's hard to turn more than about two pages without finding out how a design principle or technology has been used in the real world.

This book is also a good starting point for anyone considering the specifics of site implementation, as a number of popular technologies are compared, sometimes not favourably — one site found that Flash was about four times faster at site building, but most of their



customers went to the HTML version of the page anyway! Beyond this, use of Web technologies as they relate to good design are covered in depth, although this doesn't equate to having a training manual stuffed in there as well. This is strictly a design-centric look at Web tools.

For designers looking to expand their horizons, or Web-savvy users looking to enhance their design skills, *Great Web Architecture* is, well, great.

Alex Kidman

Author	Clay Andres
Publisher	IDG Books
Distributor	Woodslane
Phone	(02) 9970 5111
Price	$79.95
ISBN	0-7645-3246-4
Rating	★★★★★

Correction

In the November issue of *APC*, we stated that *The Little iMac Book* is distributed by Penguin, when in fact the distributor for this title is Pearson Education, (02) 9454 2200.

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Perspective

Hackers

Hackers is written by an academic and aimed at the academic community, but it is a surprisingly good read. This can, in part, be attributed to the subject matter — people who hack computers, computer networks and software. More importantly, at least from a readability standpoint, the author, University of Stalford sociologist Paul A Taylor, knows how to string a sentence together and is aware that conventional academic style can be made interesting if the writer is willing to take some liberties with the form.

Taylor tries to get inside the hacker subculture, and interpret its place in light of media coverage and the fear with which it is treated by authorities. This fear can be blamed, according to Taylor on what he calls "fear of Frankenstein", essentially the general public's fear of the unknown and, by extrapolation, their fear of those that possess the arcane knowledge required to control the unknown thing.



There are several problems acknowledged by the author that hinder any researcher's ability to get inside a specialised area like hacking, especially when the required knowledge is essentially occult or hidden information. The first problem is that tampering with computer networks is an illegal activity in many countries, including the UK, the US and Australia. Few individuals are going to want to go on the record about their behaviour, and those that do tend to do so using a pseudonym. The second problem is that the information obtained is essentially unverifiable. Conventional academic or scientific methods can't be used to reach a conclusion, which in turn reinforces one of sociology's core problems: it's a soft science at best, and one that has difficulty getting taken seriously by serious (physical) sciences.

The final problem, as if those weren't enough, was the author's complete inability to reach virus writers. As a result, viruses are generally left out of the book, which is a great pity because a well-written portrait of a virus writer would make fascinating reading.

Despite these problems, *Hackers* remains a worthy companion for those with an academic interest in the hacking subculture, and those that cover or attempt to enforce its behaviours. It's not bedtime reading, at least not for those that aren't postgraduate sociology or mass media students, but it does deserve consideration and commendation for the manner in which the subject matter is handled. It would be too easy to drain the lifeblood out of a topic like hacking, and that hasn't happened.

Josh Gliddon

Author	Paul A Taylor
Publisher	Routledge
Distributor	John Wiley & Sons
Phone	(02) 9805 1100
Price	$42.95
ISBN	1-74031-000-4
Rating	★★★☆

Virtual States

"In cyberspace, national borders are no longer relevant. Electrons don't stop to show passports." Or so claimed the US President's Commission on Critical Infrastructure Protection in a 1997 report about the threats to US national security in the information age. This hyperbole closely echoes a 1996 statement by the Electronic Frontier Foundation's John Perry Barlow, in which he warned governments that "Cyberspace does not lie within your borders". Barlow was writing in response to the passage of Internet censorship laws through the US Congress. He continued: "We are creating a world that all may enter without privilege or prejudice accorded by race, economic power, military force, or station of birth."

In *Virtual States*, Jerry Everard challenges the view that the Internet threatens the future of the nation-state. As he points out, the Internet began as ARPANet, a distributed network designed to maintain military communication following a nuclear strike. In other words, the Internet is not outside government control but is a by-product of Cold War military strategies.



However, Everard's argument that states will survive despite the Internet goes further than the reminding us of state's role in the birth of the Internet. He also points out the role states have in the formation of individual identity, writing that "Identity is arguably produced through practices of boundary making, practices that divide the idea of Self from this idea of the Other ('us' against 'them')".

From this perspective, Australia's censorship laws, which came into effect early this year, are not only about protecting children from viewing online pornography but are also an attempt by the state to define an Australian identity. We are people who only want access to information which is safe for children and ecommerce. It is no coincidence that this legislation was passed at the same time as a moral panic about illegal immigrants landing on Australia's remote coastline, as they both attempt to reinforce Australia's virtual, geographical and cultural boundaries.

Although Everard devotes a chapter to US, European and Australian attempts at censoring the Internet, he only describes state legislation, and not the Broadcasting Services (Online Services) Amendment Act. This is a very disappointing omission, as the national legislation was first announced in March, and Everard refers to more recent events, such as the high school massacre in Littleton, Colorado.

The book also shows that the Internet is not a neutral technology, but a cultural artefact which arose out of military, academic and technical cultures. This explains why Internet users are still primarily young, white men in the US. A far cry from Barlow's world without "privilege or prejudice".

Glenn Phillips

Author	Jerry Everard
Publisher	Routledge
Distributor	John Wiley
Phone	(02) 9805 1100
Price	$45
ISBN	0-415-17214-4
Rating	★★★★



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Whether it's Web tools or family tools, this month's Interactive has something for everybody.

Splash and burn

HoTMetaL Pro 6.0

APC last reviewed HoTMetaL as part of our roundup of Web tools (see *APC* August 1999, page 102), and we complimented its code-friendly design. At the same time, we weren't too keen on HoTMetaL Pro 5.0's GUI, which made it a little tricky for new users to come to grips with the complexity of HTML coding.

It seems that someone must be listening. HoTMetaL Pro 6.0 incorporates the good coding quality of its predecessor and some significant GUI improvements. HoTMetaL 5.0 is irritating because it requires frequent switching of views, but HoTMetaL 6.0 enables most functions in most views. Toolbars can be dragged, dropped and customised to your heart's content, and the overall feel of the product is a lot friendlier.

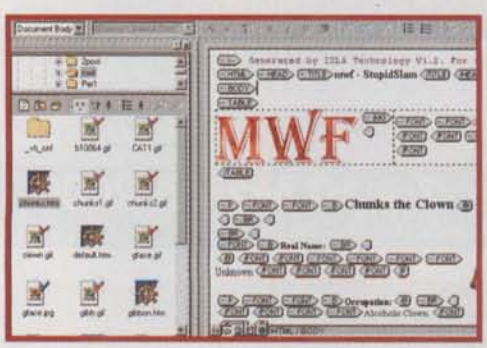
For the total Web novice, HoTMetaL also comes with a variety of predefined assets, including utilities to build button-based menus, triggered sounds and scrolling text bars. The nice thing about having these assets (apart from their appeal to the fundamentally lazy) is that HoTMetaL's easy switching from code to page enables users to properly examine code and ascertain how it works.

On the annoying side, in order to fully use HoTMetaL Pro 6.0, it's necessary to install Internet Explorer 5, which makes you wonder exactly just how cross-platform all aspects of its code will be. Apart from the server product, HoTMetaL also ships with WS-FTP, Ulead PhotoImpact, and the almost-standard collection of clip art.

When many products seem to bloat and slow down with each successive release, it's good to see a release that is an actual improvement.

Alex Kidman

Publisher	SoftQuad
Distributor	Sustance
Phone	(08) 8234 6248
Price	$169
Requires	Pentium, 32M RAM
Rating	★★★☆



Splash Web Author

Splash's hype says that Web Author is "the world's easiest Web authoring tool". Just a small boast, mind you, and one that plenty of other programs tend to make. Like many other Web tools that boast about their 'ease of use', flexibility is sacrificed.

For a start, Splash is unable to edit standard HTML — all the created files are in a proprietary format that must later be parsed into HTML. So, if you've already got some pages, you won't be able to edit them using Splash. The interface is very simple and guides you through page creation, although when first using Splash you're run through the simplest page creation possible — headlines, text, images and that's all. More effects (including some JavaScript applets) are available through menu selection, but there's not a lot to get excited about. Splash's creators, however, are pretty Net-savvy. There are options to seek out free Web space providers and sign up with LinkExchange for banner ads — although of course signing up for both may violate various free providers' terms of service.

Splash will appeal most to home users who simply want to put up a few pages. The interface is very similar to that of sites such as GeoCities, and it has a fairly bright interface. The only problem with this approach — especially if you're used to standard Windows styling — is that the buttons, although pretty, are hard to discern (we found ourselves using the menus for almost everything anyway). Splash's generated code was reasonably clean.

Splash is fun to use, but despite its claims, is somewhat limited. If you're an absolute HTML beginner, you can do worse, but you'll quickly need to splash out (sorry) for a better product.

Alex Kidman



Publisher	eTechnologies
Distributor	Scholastic New Media
Phone	(02) 4328 3555
Price	$89.95
Requires	486DX3, 8M RAM, 6M hard drive space
Rating	★★☆

EduEnglish for Adults

This is a great program for English-speaking adults who want to improve their literacy skills at home without embarrassment, and for both teachers and secondary school students of English as a second language, for classroom and home use. Designed for the Australian market, it is extremely easy to use.

After an introduction to the way the program works, you are given brief exercises on keyboard familiarisation and dictionary use — both extremely important in developing English skills.

To work through the rest of the program, start by selecting one of the other 34 topics. You'll receive an explanation of the topic, the grammar rule involved and some practical examples of how it is used. The audio option is especially useful for those with poor reading skills.

When you understand the grammar principle involved, move on to the practical exercises. The program has 7,000 randomly generated questions. This feature provides a more accurate guide to your progress by making it impossible to cheat by rote learning questions and answers, and extends the program's shelf

life because exercises can be revisited. However, sometimes the same question is repeated within an exercise and some instructions could be clearer. The graphics are also less than inspiring.

Each topic is divided into up to three levels of difficulty, comprising between 15 and 50 different questions. Two graphs (one each for right and wrong) to the right of each exercise show your progress. When you have completed the questions, the computer responds accordingly: if you haven't done well enough, it advises you to practise the exercise; if you ace it, you are rewarded with an encouraging message, a



fanfare and a smiley face. For any mistakes, double-click on the Help icon and the computer will explain where you went wrong and restate the basic grammar rule.

Updates are available online (http://www.Educorp-software.com/) and a progress log is bundled with the program.
Gail Lipscombe

Publisher	EduCorp Software
Distributor	EduCorp Software
Phone	(07) 5574 1047
Price	$69.95
Requires	Pentium, Windows 95, 8M RAM
Rating	★★★★

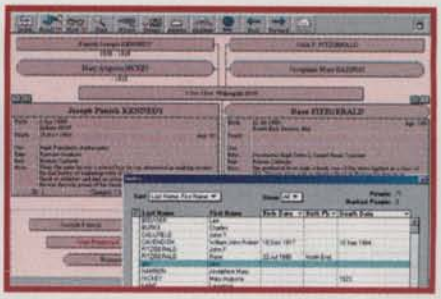
Generations Family Tree

No doubt about it, Generations Family Tree is a big provider. It provides 300 million names, the passenger list from the Titanic, two full-sized printed and bound instruction/help manuals plus eight cookbooks with hundreds of recipes. Provision-wise, it's a winner.

The main component of the 15-CD set is EasyTree, a family tree research and charting program. This is one of the best of its kind; there are almost endless options for entering and cataloguing personal details, notes, references, images, as well as the usual ancestor and descendant links. This ties in with SnapShot, an imaging program designed to help make the most of those faded sepia family snaps. With two of the discs taken up with programs and sample files, the rest of the CDs are filled to the brim with genealogical data. Why the cookbook is included is slightly unclear, as you have to provide most of your own antique recipes.

The CDs include American Civil War muster rolls, US Social Security Death indexes, US census archives (1870) and what is rather grandly called the "generations world name index". However, as with quite a few "world" things that come out of the US, that globe doesn't seem to extend outside star-spangled banner territory.

Consequently, if you buy this program you are likely to have paid $149 for only three really useful CDs and some Web links that allow you to research your family online. The other 13 CDs are likely to be irrelevant for Australian users, who will get more value doing their own research in the usual way (email, libraries, elderly relatives and so on). This



is a very nicely presented set, but not particularly good value for local genealogists.
Jeremy Torr

Publisher	Sierra
Distributor	Dataflow
Phone	02 9417 7000
Price	$149
Requires	Pentium 100, Windows 95, 100M hard disk space, 4x CD-ROM drive, SVGA
Rating	★★

Interactive News

● Although behind closed doors Microsoft management may well be very concerned about the antitrust suits pending, in public it's a very confident 'business as usual' approach. Bill Gates has predicted that there will be a huge rise in streaming technology as broadband connectivity really takes off – and with a bit of luck Australia won't be too far behind the rest of the world. At the Streaming Media West 99 show in California late last year, Gates outlined Microsoft's strategy to combat its main competitors in this field — Apple's QuickTime and RealNetworks' software. Interestingly, though Microsoft's MSN portal and the joint venture with NBC for the MSNBC cable channel are strong content providers, Gates said that the main thrust for Microsoft is to provide the infrastructure for streaming content rather than the content itself. Integral to this strategy are the forthcoming versions of Windows Media Player which, along with an up-to-date feature set, will be strongly pitched towards non-PC devices — like, perhaps, a certain Microsoft console/set-top box? Microsoft's X-Box has to be one of the worst-kept secrets in a long, long time.

● But it's not just streaming media — Microsoft has also caught the WAP (Wireless Application Protocol) bug along with just about everyone else, it seems. It has entered into a deal with Swedish mobile phone giant Ericsson to develop products and applications for WAP. The deal is that a separate company will be formed (with Ericsson holding the majority interest) that utilises Ericsson's WAP and Microsoft's Mobile Explorer for mobile Internet access. Interesting times indeed. Microsoft has also done a deal with a range of telecommunication businesses worldwide, including Japanese cellular company NTT DoCoMo and British Telecommunications, as well as investing in up-and-coming carrier services Nextel and Qwest Communications.

● Lastly, the piracy/backup crackdown (pun intended) for MP3 files continues apace and looks as though it won't be ending any time soon. Napster (http://www.napster.com/) has designed a MP3 application, ostensibly for people to source free music files and promote a musical development 'community' online. Not surprisingly, it's also being used extensively to download copyright protected MP3s, and the major record companies have sued (for $US10,000 per song) in a bid to get the site shut down. You get the feeling this is going to happen over and over again, don't you?
Gareth Jones

Fly through space, shoot hoops and slay zombies.

No place like home

Homeworld

Homeworld is a beautiful game. Stunning nebulae flow effortlessly in the distance as you move with complete freedom along the three axes, your ships dancing in your view as they carry out your commands. Not only has Relic created a fantastic game engine — the screenshots (below) don't do it justice — but it has also created a whole new genre. Real time strategy (RTS) games have become the gaming industry's staple diet, but as a result the genre has slowly faded with the onslaught of clone after clone.

Homeworld takes the RTS model and adds a new dimension, the third. Forget about resource building and unit commanding on a 2D map, Homeworld is the same trusted RTS premise taken into space with the full 360° of freedom it offers. Imagine waging and watching battles from any angle at any distance, changing your view easily at any time, the vastness of space panning in the distance, and you have Homeworld.

Obviously such a leap into space requires a rethink of the standard RTS interface. Relic has done a fine job of creating a quick and easy control mechanism that allows you to rotate, zoom, focus and issue orders through the mouse and a few simple keystrokes — exactly what you need when you've got to command a fleet in three dimensions.





As with most RTS games, the technology tree is simple. There is a single mothership which acts as a base to build units on and which must be defended at all costs. From this mothership you can build harvesters, research units, probes, support craft, scouts, fighters, bombers, warships, mine-layers, capital ships and more. There's a good balance between craft type and variety. There are mostly only one or two per category, but these adequately cover your needs. When their respective traits are combined you can form vast fleets with which to lay waste your enemies (such as your best friend sitting across the room).

There are only two sides in Homeworld — Kushan and Taiidan — although the one-player campaign focuses on the Kushan, charting their adventure across the stars as they attempt to find their origins, their homeworld.

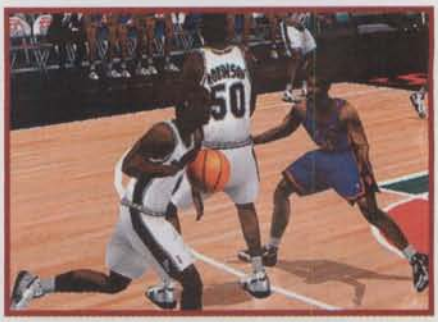
The one-player campaign is well designed, complete with anime-style scenes, and the multiplayer aspect is as bright as the explosion from a conquered mothership. If you're looking for the latest and greatest in RTS, this is it.

Ashton Mills

Distributor	Dataflow
Phone	(02) 9420 6700
Online	http://www.sierrastudios.com/games/homeworld
Price	$89.95
Requires	Pentium II 233, 32M RAM, 4x CD-ROM drive, 100M hard disk space
Classification	G
Rating	★★★★★

NBA Live 2000

This version of NBA Live was well worth the wait. There has been a real effort to replicate both authentic-looking court play and the atmosphere of a real game. This has mainly been achieved through animation: players have changing facial expressions, the spectators move in response to on-court action; and there are even the theatrics of the pre-game team introductions. You can also hear the on-court comments of the players reacting to referee decisions.



AI in NBA Live 2000 is quite remarkable. Gameplay is as close to a real basketball game as you can get. In this version you have more control over how the game is played, which makes it more of a challenge. Another area of the on-court play that has been greatly improved is the defence.

There are a number of new play modes, including one-on-one street ball and a three-point shoot out. Apart from the first-time inclusion of Michael Jordan in a computer game, NBA Live 2000 has added most of the basketball greats from a 50-year period of the NBA. You can finally play fantasy games that match up legends of yesterday against champions of today. For added realism in choosing teams, the NBA draft has been replicated.

You can also play as yourself against your NBA heroes. Scan in your own face and those of your friends and take on the best in basketball history. As an added dimension, you can compete with other gamers over the Internet.

One grating aspect of this game is the commentary. If you play for long enough, the repetitive phrases can be very annoying and the voice-overs are not always in sync with the play.

This minor irritation aside, NBA Live 2000 is the best basketball simulation for the PC and is a must for the dedicated basketball fan. Who could possibly pass up the chance to go one on one with Michael Jordan?

Gail Lipscombe

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Distributor	EA Sports
Phone	(02) 9955 7744
Online	http://www.easports.com.au/
Price	$69.95
Requires	Pentium 166, Windows 95, 32M RAM, 4x CD-ROM, 90M hard disk space, 4M video card, DirectX 6.1
Classification	G
Rating	★★★★

Nocturne

At first glance, Nocturne is very much a descendant of the Alone in the Dark (AITD) series, but with better graphics, audio, level design and story-lines. They both feature horror story-lines, but Nocturne has less of a H P Lovecraft feel. In Nocturne there are infestations of vampires, demons, zombies, werewolves and the like that need investigation and cleansing. This is where you, the Stranger, an agent from the Spookhouse, come in.

As with the AITD series, the action is viewed from a variety of camera angles. One second you're running at the camera, the next you're running away from it. This adds to the ominous atmosphere of the game, as you never really know what's around the corner. When a game vendor recommends you turn the lights off and the sound up, it's usually a gimmick, but this time the advice is worth taking. It heightens the feelings of fear and doom.

The game is split into four stories which you can play in any order. The first involves a werewolf/vampire outbreak in the forests of Romania. In the second, a small town in Texas is having mild problems with the local zombie population. The third involves Al Capone in the 1930s, reviving the dead as Frankenstein-like goons and thugs, and the last chapter has a French castle overrun with all manner of nasties.



There is very little to fault this game — the graphics are beautiful, the audio is haunting (and frightening at times), and the design of the levels and creatures is superb. In a very John Woo-like touch, the Stranger's base weapons are a pair of pistols, one held out in each hand. Laser targeting helps to pinpoint the nasties in the dark, but you can't always see them all. You'll be making tentative keystrokes with this one.

Darren Ellis

Distributor	Jack of All Games
Phone	(02) 9482 3455
Online	http://www.nocturnegame.com/
Price	$89.95
Requires	Pentium 233, 64M RAM, 500M hard disk space
Classification	M(15+)
Rating	★★★★

Revenant

Attempts to cash in on the success of Blizzard's Diablo have seen a multitude of role-playing games (RPGs) enter the PC market. Eidos' Revenant joins this ever-growing list, but it offers a little more than the average clone.

In Revenant you play a resurrected warrior/mage called Locke. Locke has been recalled from the depths of hell to assist a wealthy lord recapture his daughter from the grasp of evil priests who have overtaken the town. To repay the lord for returning you from the dead, you must follow his orders. There are no real sub-goals or extra missions you can pursue, just a set path to save the damsel in distress from evil sorcerers. This linear structure detracts from your sense of involvement in this world — and ruins any chance of replaying the game.

Revenant is still very enjoyable, despite its clichéd plot and limited scope. There are sufficient statistics, skills and character

Games News

● Last December, the first Australian Game Developers Conference was held in Sydney's Kings Cross. Though not as wide in scope or duration as the UK or US developer conferences, just about every Australian developer of note was there, along with a fair proportion of 'up and comers'. Most attention was given to the overseas guests, in particular Juan Montes from Sony Europe (SCE). Montes was not only at the conference to host a talk, he also spent most of the three days chatting with the local developers to discuss details of games that they might be producing for the forthcoming PlayStation2. Gamespy has a few scoops I'm dying to tell you about, such as AAA titles from top Australian developers for PlayStation2 and PC, but I'm not allowed to spill the beans just yet. Next month, I promise.

● One thing I can reveal is that Microforte is working on a very impressive project, which looks like it could put them on the world map. It has the working title of BigWorld and is a massively multiplayer online RPG (MMORPG). Nothing special about that, you think? Well, for starters it's not a dungeon hack fantasy setting. It has a sci-fi setting with an extremely impressive story-line and some truly next-generation graphics. It will also be available for both PlayStation2 and PC (and possibly Dreamcast as well). More information will be available soon, although the game isn't due for release until 2002.

● And lastly, although the situation will have been fixed by now, I can't let the debacle of the Australian Dreamcast launch go without mention. Not only did OziSoft (allegedly) cancel the official launch at SegaWorld at very late notice, leaving SegaWorld management very put out, but more importantly the actual system was made available through retail outlets without any Sega titles, no VMUs (memory cards) and no Internet CD! What was the reason for this? According to OziSoft, it was due to unforeseen circumstances (such as the games being held at customs longer than expected and so on), but it seems to reflect poor planning. Anyway, the Dreamcast system is a great console, and hopefully by the time you read this games and peripherals will be widely available.

Gamespy



levels to excite RPG enthusiasts, but not enough to alienate new gamers. Combat is best controlled through either a gamepad or the keyboard, using different keystrokes to perform weapon manoeuvres. Although it is still simple, this system is far superior to the point-and-click interface used in games such as Diablo.

Other RPGs have been let down because you can't clearly see what's happening when you are fighting, which renders even the best combat system useless. This is not the case with Revenant. It has an isometric viewpoint, and its high-resolution graphics provide rich and colourful surroundings which allow you to clearly see what is happening while retaining beautiful backdrops in great detail.

Despite its linear plot and a few glitches, Revenant shines through as an RPG worthy of purchase. Its combat system is intuitive, and there's plenty of room for exploration and investigation.

Alan Crawford

Distributor	OziSoft
Phone	(02) 9317 0000
Online	http://www.eidosinteractive.com/
Price	$79.95
Requires	Pentium 233, 32M RAM, 4M DirectX video card
Classification	M15+
Rating	★★★

Theme Park World

The original Theme Park was fun, but somewhat limited. You could design your park using SimCity-like principles, but compared to the god sims that existed at the time, it was considered cute but lacked a lot of heavy-duty options. It also suffered a touch from its clumsy interface.

This year's release of Microprose's excellent Rollercoaster Tycoon finally gave simulation fans a great interface mixed with the evil joys of charging $20 for a bucket of stale popcorn. Gremlin hasn't let this one pass, and has released Theme Park World, merging a full simulation with the cute appeal of Theme Park.

Visually, Theme Park World is a stunning game, providing your hardware supports it. *APC* tested it on a Pentium II 333 with an 8M graphics card, and there was still plenty of room for extra graphic details that couldn't be fitted in. People go on rides, eat bad food and eventually throw up in the delightfully appointed toilets with complementary gusts of green steam flowing from them.

Parks can be designed along a variety of themes, from horror to high-tech, although the differences are purely cosmetic as the same types of ride run in any park. The usual run of custom rides is also available, from roller-coasters to water rides, and anything can be



updated with enough research money. *APC* was particularly taken with the virtual camera mode, which allows you to wander around your park in the first person, and even go on any of your rides.

If you have the money and a hankering for simulations, get this *and* Rollercoaster Tycoon, but if you want a simpler sim with prettier looks, then Theme Park World is a lot of fun.

Alex Kidman

Distributor	Electronic Arts
Phone	(02) 9955 7744
Online	http://www.themeparkworld.com/
Price	$69.95
Requires	Pentium 200, 32M RAM, 4x CD-ROM, 300M hard disk space, 4M graphics card
Classification	G
Rating	★★★☆

USAF: United States Air Force

Janes has piloted the middle course with this combat flight sim, successfully producing a game that will appeal both to newbie pilots with an urge to get their hands on a joystick, and to seasoned fighter jocks who are looking for a bit of relief after the rigours of Falcon 4.0 or Flanker 2.0. Don't be misled into thinking that USAF has been dumbed-down, though. The 150-page manual included with the game should be enough to indicate that there is still plenty to chew on.

USAF offers you the chance to fly nine different jets, from the trusty F-4 Phantom and F-15 Eagle, to more esoteric craft, such as the A-10 Warthog, the F-117A Nighthawk stealth fighter and the next-generation F-22 advanced fighter. You can even take a spin in a MiG-29.

As you'd expect with all these features, some compromises have been made. The heads-up displays are very similar, and the flight models are not as different, or quite as accurate, as you'd get with a standalone single-plane sim. Still, there are enough differences to give the distinct feeling of piloting unique craft. The individual cockpit panels, while generally carrying similar information, are depicted faithfully.

The wealth of options goes way beyond the number of aircraft. Four expansive campaigns are included, both historical and futuristic, along with an instant action option and highly customisable single missions. Add a powerful mission editor and the sky (so to speak) is the limit. The graphics are among the finest ever seen in a combat flight simulation; they include gorgeous terrain and some excellent canopy flare effects. Add it all together, throw in a polished multiplayer option, a comprehensive career mode and some great sound effects, and you have one of the most fun flight sims available.

Jon Gill

Distributor	Electronic Arts
Phone	(02) 9955 7744
Online	http://www.janes.ea.com/
Price	$89.95
Requires	Pentium 200, 64M RAM, 550M hard disk space, DirectX 6.1, 6x CD ROM drive
Classification	G
Rating	★★★★☆



Make an online travel site your first holiday destination stop.

Siteseeing

Lonely Planet Online

"Longitude. Latitude. Later dude." That's the slogan atop one of the oldest and best travel sites on the Net. Lonely Planet Online was around before most of its readers knew how to surf. Anyone who has backpacked knows the Lonely Planet series of guidebooks — sometimes loved, sometimes hated, but always offering down-to-earth advice on what's good and bad about your destination.

Although the company (based in Melbourne, but known globally) employs researchers and sends writers out into the field, it gets many of its leads from readers. When backpackers discovered email in 1994, Lonely Planet did too, and shortly afterwards it put up a Web site offering updates to the information contained in its books and reader letters. It was a logical step, but very innovative at the time.

Today the site is more graphical (although it does offer a Text Express option) and includes a daily news section covering hundreds of destinations, health tips and some tall tales from the researchers. Inevitably the site is also a sales vehicle for the books, but this is done in an unobtrusive way and can save time if you're after an unusual title.

Perhaps the best feature of the site is The Thorn Tree — "the bulletin board for people with itchy feet" — where prospective travellers can ask questions and have them answered by those who have just returned, or even those who are reading the board from cybercafes overseas. The discussion is always busy and can offer real insight into current events and the safety level of travellers in hotspots. There are often more questions than answers, but many queries are answered in other threads.



The best thing about Lonely Planet's site is that every part of it is useful — this Web site exists for the readers, not just to show off the company's logo.

Simon Vandore

Online http://www.lonelyplanet.com.au/

Rating ★★★★★

travel.com.au

When you pay a visit to your local travel agent, what do you expect? Picturesque brochures, plenty of advice, lots of options and the best deal for your money. But, what should you expect when you visit an online travel agent? Exactly the same, but cheaper, faster and more convenient, right?

Well, if you're using travel.com.au, wrong! As far as Internet travel services go, this operator fails dismally.

During the past six months I have been in the throes of planning an African expedition, taking in South Africa, Zimbabwe and Mauritius. After spending many torturous hours at the travel agent discussing my options, I have only just finalised the arrangements.

Hardened by experience, I went online to see if I could have planned my trip more easily and saved myself some money along the way. After experimenting with travel.com.au, it seems unlikely.

In an attempt to keep pace with the shift in online travel from offering generic flight and package deals to tailoring services to individual needs, travel.com.au has divided its Web site into region-specific sub-sites.

At first glance, the Africa section appears to have a wealth of information on everything from cities to different safari styles to guides. Click through, however, and you'll find that the level of information is extremely superficial. The site also completely lacks brochure-style content — no pictures or detailed information on different destinations, accommodation, tour operators or holiday options. Prices are also notably absent.

What is even more frustrating than the lack of useful content is the limitations of travel.com.au's online planning, booking and payment capabilities. If, like me, you want more than just a simple flight and accommodation combination, you have to fill in a form and wait for a consultant to email or call you back. Not only is this a primitive process in the cyber age, it is also more time consuming.



To give travel.com.au its due, it's great if you're after cheap airfares or a package deal. In fact, the recommendations from travel.com.au's consultants are probably the site's best feature.

However, travel.com.au has yet to really progress from offering stock-standard holiday options. I would still choose a conventional travel agent over travel.com.au.

Cosima Marriner

Online: http://www.travel.com.au/

Rating: ★★

Walkabout

Although the term 'walkabout' was originally coined by early white settlers when Aborigines undertook a period of wandering for spiritual replenishment, colloquially speaking, walkabout is synonymous with going on a holiday or, more specifically, itinerant travel.

Whether you have a predetermined destination or you're just checking out your travel options, Walkabout: The Australian Travel Guide is a good place to begin your nomadic journey around Terra Australis.

The site is comprehensive, well presented and easy to navigate — made easier still by the alphabetical list of destinations. Simply follow the link to your desired location and Walkabout provides detailed information about the destination and its surrounding area (elevation, population, major festivals



and a brief history of the region), things to see and do, places to stay, sightseeing info and even places to grab a quick meal.

Walkabout also features some background information for travellers such as a brief history of Australia. It doesn't claim to be an in-depth history, so don't expect to learn anything new. Travellers from overseas will probably find this feature more useful.

The site has a very useful search facility to help you find specific information quickly. For instance, if you want to go whale watching, just enter the keywords and the search engine will return a long list of places where this is possible.

Travellers Tales — a section on other travellers' experiences — is somewhat amusing and insightful. If you don't like the informal storytelling approach, Walkabout also has a reference section with books, maps and useful guides.

This is a great place to continue the tradition of the great Australian walkabout.
Jon Kinred

Online: http://www.walkabout.fairfax.com.au/
Rating: ★★★★☆

Australia Tourism Net

Australia Tourism Net reads like a glossy travel brochure. "Heritage, wilderness and unspoilt beauty abound in this the jewel of Australia's crown, Tasmania. Captivating, invigorating and exhilarating . . .".

In essence, Australia Tourism Net is a portal to an extensive collection of Australia-wide Net links (read: an advertising-driven travel agency) packaged in the form of a travel directory.



At Australian Tourism Net, you become your own travel agent. The site is based on an interactive map of Australia — just click on a destination or an area of interest and you'll be presented with relevant information.

Don't expect to find conventional travel activities, however. Australian Tourism Net's focus tends to be on ways of exploring parts of Australia that are off the beaten track. For instance, you can choose to take an outback safari, an adventure or fishing tour, charter a boat or hire a motor home. It also includes a comprehensive reference guide to Australian national parks.

By far, the most impressive feature is the Australian Towns Index. Whether you're heading for Ballina (NSW), Berri (SA) or Bairnsdale (Vic), this A to Z of Aussie towns, cities and isles is sure to provide handy details.

The site provides practical tourist information — climate and time zones, customs and quarantine, visa information, language, holidays, telephones — which is of particular value to overseas travellers.

What Australia Tourism Net lacks in innovation and creativity it makes up for in usefulness. If nothing else, it's one of the more informative DIY Australian travel sites you'll find on the Internet. It certainly does away with the need for a travel agent.
Vanessa Fazzino

Online http://www.atn.com.au/
Rating ★★★

Surfbaud: The road less unicycled

If you're planning something unusual for your next holiday — mountain unicycling for example — you're unlikely to find a travel agent or guide book to help you, but you will probably be able to find a Web site about someone's mountain unicycling adventures. People seem to have an urge to share their travel experiences with others, even if the others aren't particularly interested in their stories. Everyone has read a bad travel book or suffered through an uncle's slide night about his fishing trip to Lake Pedder. Fortunately for us, his nephews and nieces, our uncle can now share his fishing stories with a much wider audience by setting up Uncle Bob's Fishing Trips Home Page on the Internet. As boring as these tall tales of trout may be to us, there are probably a few other fisherfolk out there who want to hear about the one that got away.

To look for sites about mountain unicycling holidays, try an Internet directory such as Yahoo. Yahoo Australia has links to mountain unicycling pages in its Recreation/Sport/Cycling/Unicycling category. Not all of these sites will help you much with your holiday plans, but hey, if you don't like what you see, press the back button. There is, of course, a mountain unicycling FAQ, where you can learn that the preferred abbreviation for mountain unicycle is 'muni', along with a lot of information about the 'sport'. The FAQ will help you with questions such as 'Is mountain unicycling dangerous?' and 'What skills can I practise to help my muni technique?' It also provides advice on helmets, kneepads and gloves.

There are links to muni groups around the world, but it does not link the page describing two unicyclists' trip along the Six Foot Track in the Blue Mountains. The author of the page, James Gifford, describes the camping equipment and bike tools used, the route taken, the problems encountered and the gradual deterioration of the unicycles during the trip. There are also photos of Gifford and his companion negotiating the trail.

His conclusion: "I doubt it will ever take over from bushwalking as the primary way of enjoying the bush", although "it is certainly worth a go".

If you had a muni holiday in mind this summer, you now have some idea of how to go about organising it. There really is information about *every* possible holiday on the Internet, no matter how strange you may think it is.
Glenn Phillips

- **LookSmart Australia**
 http://www.looksmart.com.au/
- **Yahoo Australia**
 http://www.yahoo.com.au/
- **Mountain Unicycling FAQ**
 http://expert.cc.purdue.edu/~bymaster/muni/faq.html
- **Unicycling the Six Foot Track**
 http://room.anu.edu.au/~james/sixfoot/

A day in the life of ecommerce.

Chip Chat

When Chip Chat was a schoolchild, one of the standard creative writing assignments that would be given to the class by our frazzled Year 3 teacher, Miss Fields, who slowly came to realise what absolute bastards most eight-year-olds can be, went a little something like this: *Write about a day in the life of a 20 cent piece.*

Chip Chat, being a deeply unpleasant child, was often drawn towards writing about what happened to 20 cent pieces which ended up in the intestinal tract of dogs or were vomited on outside pubs. Miss Fields was rarely pleased with this kind of work, preferring saccharine tales involving grandmas, guinea pigs and a Paddle Pop or two.

For no obvious reason (other than perhaps a cursory re-reading of *Tom Brown's Schooldays*), Chip Chat has recently been reflecting on these lost gems. Are modern day schoolchildren still assigned this kind of work?

Of course, there would need to be some currency adjustments — a day in the life of a dollar coin might well be requested — but it seems to us that there's a more fundamental problem. As we move towards a cash-free era in which online currencies, credit cards, EFTPOS and ecommerce prevail, will children even be able to understand the concept of a coin travelling from cash register to pocket and back to cash register again?

Things could get ugly. In order to prove just how ugly, Chip Chat is proud to inaugurate the very far from annual *A Day in the Life of . . .* selection.



A day in the life of a credit card Do I ask for much? No! Just an occasional swipe through a magnetic reader is all I need to make my life complete. But do I get it? Oh no! Instead, my jerk of an owner (who hasn't even signed me yet) just gets me out of his pocket every so often so he can type in my details to sign up for foxychicksonheat.com. Why bother? You'd think he could remember my number by now!

A day in the life of an online transaction Someone will use me, some day. If this bloody server ever stays up for long enough.

A day in the life of a PGP key mQCNAzGvo90AAAEEAJzoSZShTi6RQW73+0kZirz/PMVtNqh+s9mNimbPoxKNAb17PIStS2FDayKiriNC2heXfs7UrqUT9zGL7qFjj67fd7ai7H5hayY6JAXZbyuUl3/z0r0Zk1V2e7CweSGKFVcj19HWbmwdR6B80lgs5MAJ8qRTFEQYX9YIjGSLCJi1AAURtCdBbnRob255IFcgT3dlbiA8YW50b3dlbkBlbnRlcnByaXNlLm5ldD6JAJUDBRAxr6Pe1giMZIsImLUBAfk7A/9WSxPNQoQXgXzBcJAYdC2gbNwT47i5VKGKiK1zPdnZ.

A day in the life of EFTPOS Have you noticed how the queues are getting longer? Yes, it's all because of me! Me! Me! Everyone loves me, from the idiot housewives who can't remember to get out enough money each week to the bankers who watch all those extra transaction fees piling up. The world is mine!

A day in the life of ecash Once I built a network, made it run, didn't crash much of the time. Once I built a network, now it's a dud; brother, can you spare an edime?

A day in the life of smartcards OK, enough pilot projects already.

A day in the life of Amazon.com Today, we launched a new site aiming at a previously untapped segment of the market: preloved garden implements. We're still not making any money, by the way.■

Technology gag of the month

Technically, this month's winner isn't a joke, but it made us laugh. Anthony Chidiac sent us this transcript of a conversation with Phil, the automated help robot at Planet Internet.

User: What is the hourly rate?
Phil: All of our modems are 56K V.90
User: That's nice to know.
Phil: Sorry, I didn't understand your question.
User: I don't understand your answers!
Phil: My apologies, but I couldn't quite understand that. Could you please rephrase it?
User: OK Mr robot . . . u suck big time.
Phil: By entering your user name, password and the month you wish to see, you will be able to view the day, time and duration you were connected to the Internet for.
User: Big *#!ing deal.
Phil: I'm sorry, but I didn't get your meaning. Maybe you could be a little more specific.
User (being tricky): You are the best.
Phil: If you download a lot of data and do not access the Internet a lot then the hourly plans would suit you. If you use the Internet a lot for research, and you do not download a lot of data then the unlimited hours would suit you.
User: Are you a wanker?
Phil: 32 Glenferrie Road Malvern Vic 3144

Anthony will be rewarded with an Addicted to Noise T-shirt, a National Semiconductor card holder and the RollerCoaster Tycoon Added Attractions Pack. You too can join the *APC* gagging team. Send your technology jokes — the shorter and funnier the better — to chipchat@acp.com.au. If we publish your joke, you'll win specially selected items from the *APC* prize cupboard.



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